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Indexed in the Industrial Arts Index.  
Published every Thursday. Subscription Price: United States and Possessions, Mexico, Cuba, \$6.00; Canada, \$8.50; Foreign, \$12.00 a year. Single copy, 25 cents. Annual Number \$1.00. Cable Address, "Ironage, N. Y."



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# THE IRON AGE

## Contents

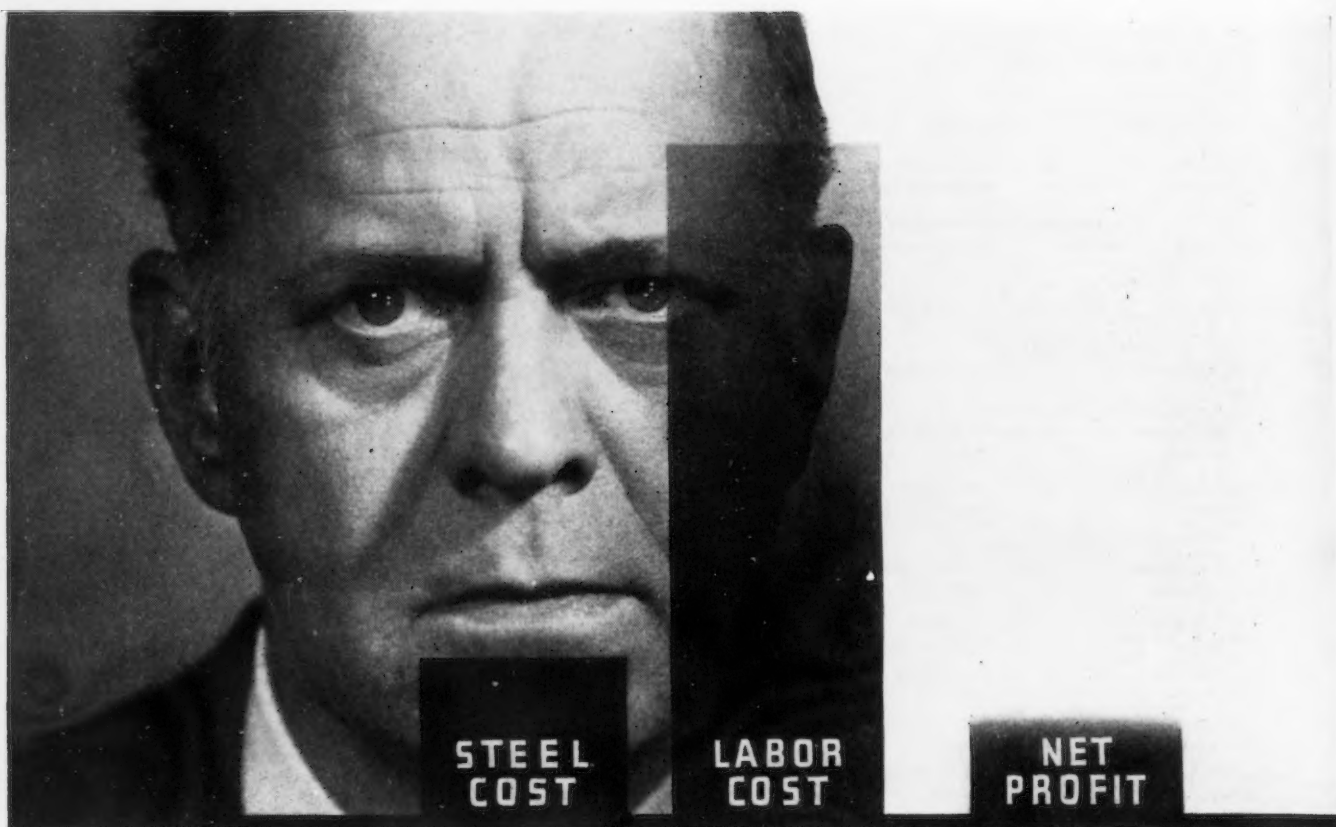
**February 29, 1940**

Good and Bad Inventors .....	25
Industrial Radiography .....	27
Theory and Practice of Slag Control .....	31
Automatic Lubrication of Production Machines .....	36
Engine Founding in the Modern Manner .....	40
New Mill Starts Stainless Production .....	42
Grinding Cracks in Quenched Steels .....	44
What's New in Welding Apparatus .....	46
On the Assembly Line .....	52
Washington News .....	56
THE NEWS IN BRIEF .....	76
Weekly Ingot Operating Rates .....	81
Rate of Activity in Capital Goods .....	81
Plant Expansion and Equipment Buying .....	98



Free Industrial Literature .....	104
Products Advertised .....	109
Just Between Us Two .....	110
Index to Advertisers .....	134

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# ▲▲▲ THE IRON AGE ▲▲▲

FEBRUARY 29, 1940

ESTABLISHED 1855

Vol. 145, No. 9

## Good and Bad Inventors

THIS week marks the culmination of the local and national celebrations honoring the inventors of America whose work has contributed most effectively to American life and living during the past quarter century. Modern pioneers, these, who have discovered, surveyed and opened new paths to progress, new avenues to employment and who have charted the course to new levels of comfort and high living standards for their fellow citizens and the world at large.

The 500 American inventors who have been honored with awards and the thousands of other practical "idea" men not included in this necessarily incomplete category may aptly be described as composing the mainspring of American industry.

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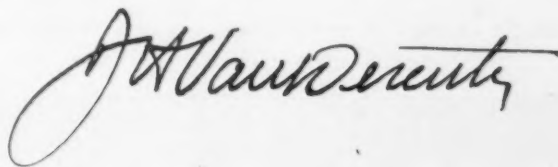
Agriculture depends on industry and upon its employees for markets. Merchandising depends upon industry and agriculture for the products which it sells. Banking depends upon industry for the creation of new markets and new wealth as well as for the maintenance of existing financial demands. Government depends upon this vital creator of national wealth because it is the primary generator of tax revenues from profits and wages. Investors, large and small, depend upon industry because its state of health is the criterion of values.

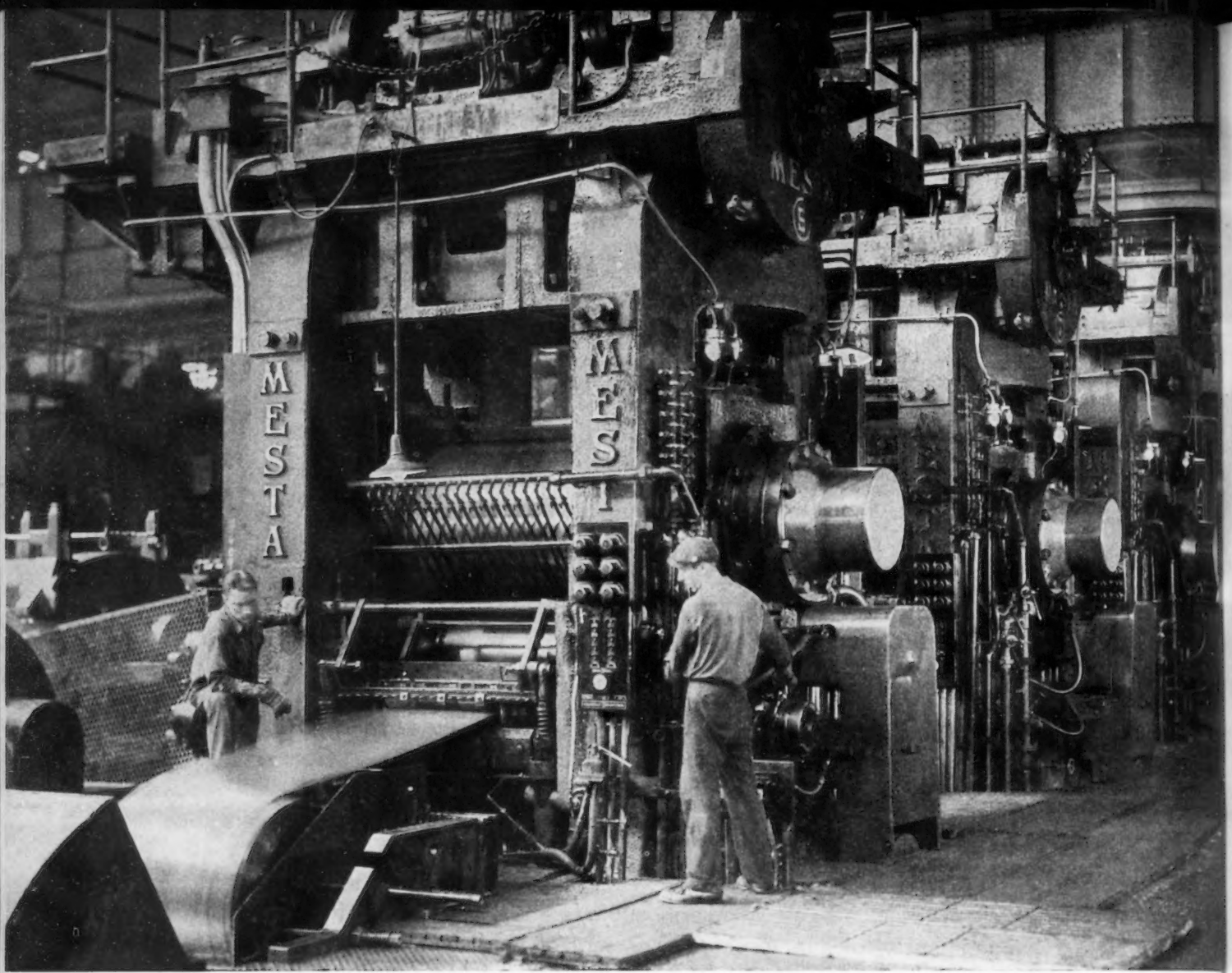
No matter who you are, doctor, train conductor, mechanic, laborer or interior decorator, your welfare is tied fast to the prosperity of American industry. And if you happen to be on relief, that goes double, for industry and its dependent, agriculture, are paying your wages.

We are doing a significant and appropriate thing, this month of February, in honoring these 500 inventors and their thousands of equally deserving associates. But don't let us stop at that.

From self-interest, as well as from a desire for the good of all of our people, let's learn to distinguish the good from the bad inventors.

Good inventors, like the men who have been selected for signal honors as Modern Industrial Pioneers, have contributed to the health and growth of American industry. Bad inventors, on the other hand, spend their time in discovering and devising ways to promote class hatred, dissipate wealth, and obstruct the normal and legitimate progress of American enterprise.





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# Industrial Radiography

BY ROYAL G. TOBEY

*Physics Department  
Eastman Kodak Co., Rochester, N.Y.*

**I**N 1895, Wilhelm Konrad Röntgen<sup>1</sup> announced to the world the discovery of "a new kind of ray." It is of interest to note that in his preliminary communication he mentioned having six photographic shadow pictures. Of these, five were industrial in nature. One was described as showing the lack of homogeneity in a piece of metal. From this beginning, industrial radiography has grown into a vital tool for the non-destructive examination of materials.

Tremendous strides have been taken since the original industrial radiographs were made, and many factors have contributed to the growth. One of the outstanding dates associated with the growth in this country was the adoption of the A.S.M.E. boiler code in 1931.

The thickness of material which can satisfactorily be penetrated is directly related to the kilovoltage capacity of the X-ray generating equipment. The equipment manufacturers have progressively increased the scope of their machines from 100 to 200, 300 and now 400-kv. capacities. In so doing, the practical thickness of steel penetration has been increased from 1 in. to 2 in., 4 in., and finally 5 in. The size and weight of industrial units have been reduced so that 220-kv.

**T**HE important practice of X-ray inspection of metals is undergoing constant change and improvement. What the latest advances in equipment for industrial radiography are, technique of continuous and planar inspection, types of protection necessary, etc., are all treated by the author herein.

o o o

machines are easily portable, and even in larger sizes the flexibility of movement permits considerable manipulation. The portable machines are usually mounted either on a small trailer type truck equipped with pneumatic tires, or on a miniature flat car for use on steel track.

Most industrial equipment manufactured today is shock-proof and ray-proof. Fig. 1 shows a recent 220-kv. portable industrial X-ray machine. The control panel is at ground potential; the transformers and valves are immersed in oil contained in grounded steel shells. The high voltage is delivered to the X-ray tube by insulated flexible cable incased in grounded metal. The X-ray tube itself is housed in a grounded metallic tube head. The cooling and insulation of the tube is maintained by forced circulation of oil. Controls are conveniently grouped in a lead-protected cabinet.

The mounting of the tube is extremely flexible and is counterweighted for easy movement on ball and roller bearings. The tube is so shielded that X-radiation can emerge only through the port provided, which greatly facilitates the adequate protection of personnel and film. Operation of such a unit is simplified by automatic controls, which operate the oil cooling system, shut the X-ray machine off should any part of the cooling system fail, gradually build up the pre-selected tube voltage by means of a motor-driven rheostat, operate a lead shutter built in the tube head so that the exposure is not started until full voltage is applied to the tube and conclude the exposure after a pre-set time interval beginning simultaneously with the shutter operation.

Fig. 2 illustrates another recent portable 220-kv. industrial X-ray unit of somewhat different construction. In this case, all of the high voltage equipment including the X-ray tube, is contained in a single grounded metal tank, from which the radiation emerges through a lead-lined cone. Minor changes in the arrangements can easily be made to fit a particular application. Fig. 3 shows a 400-kv. unit capable of penetrating 5 in. of steel.

## Continuous Inspection

The continuous X-ray inspection of small items has been successfully accomplished in industries manufactur-

<sup>1</sup>W. K. Röntgen (Würzburg), "On a New Kind of Rays," *Nature* (London), 53, 274, Jan. 23, 1896. Translated by Arthur Stanton from the *Sitzungsberichte der Würzburger Physikmedic Gesellschaft*, 137, December, 1895.



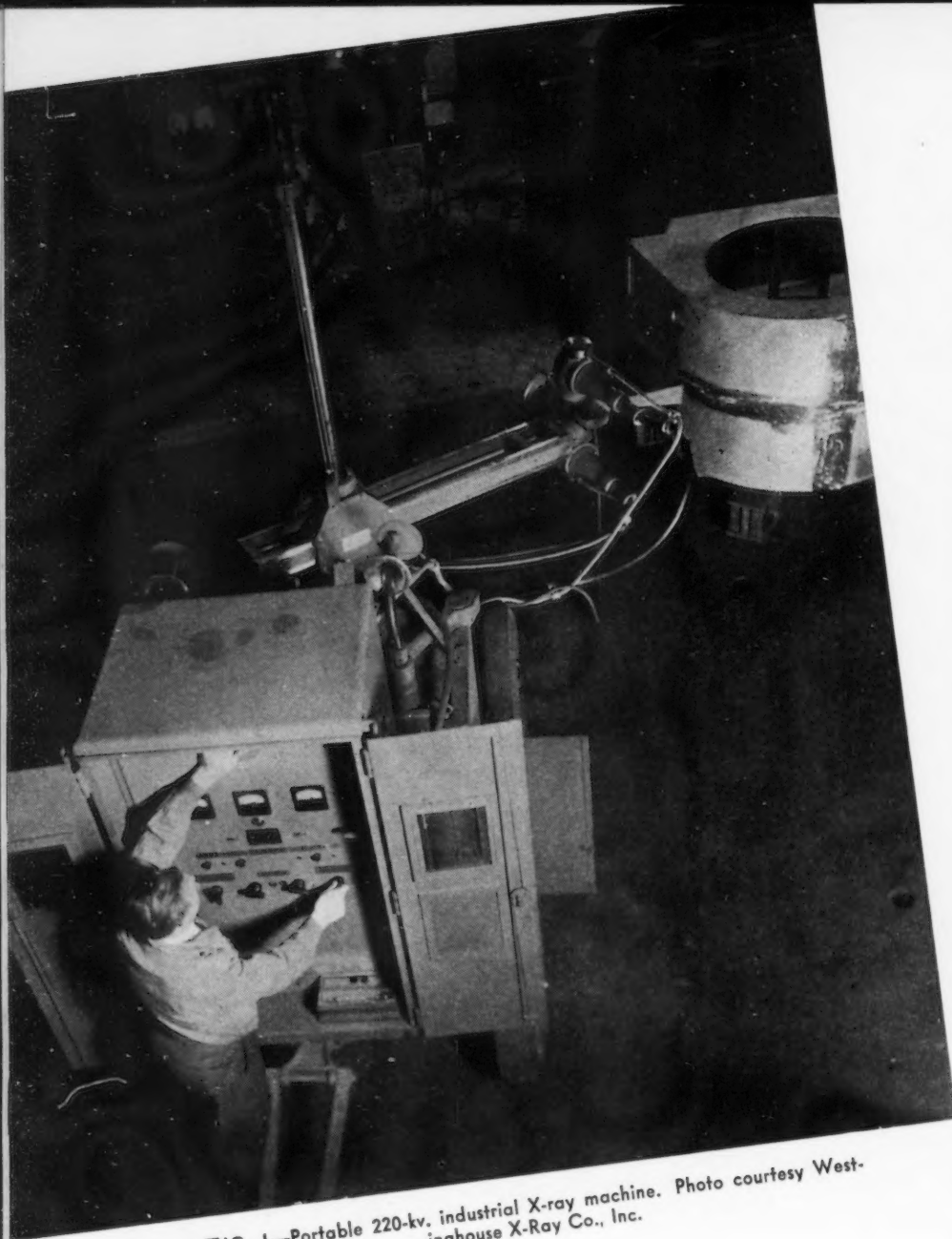


FIG. 1—Portable 220-kv. industrial X-ray machine. Photo courtesy Westinghouse X-Ray Co., Inc.

ing materials of low absorption. This has been done by means of fluoroscopic units. For fluoroscopic inspection the X-ray tube is usually mounted below or behind a moving belt which carries the articles between the X-ray tube and a chemically treated screen. The chemicals on the screen have the property of emitting a greenish-yellow light of an intensity depending on the X-ray energy reaching the screen. Therefore, a shadow image of a box of candy, for example, would clearly indicate, as a dark spot, any foreign body such as wire, stones, etc., which might accidentally have been included. The operator, watching the screen, can

<sup>2</sup> Handbook No. 20 and Handbook No. 23 of the National Bureau of Standards, Superintendent of Documents, Government Printing Office, Washington, D. C. Price 10c. each.

<sup>3</sup> L. S. Taylor, "Industrial X-Ray Protection," A.S.T.M. Bulletin, No. 99, 23, August, 1939.

operate a mechanism which rejects any questionable items for further inspection. This method of inspection has been used for inspection of canned goods, packaged candy, tobacco and citrus fruit.

Basic units are commercially available which may require minor changes in conveyor and rejection methods to adapt fluoroscopic inspection to different applications.

The capacity of X-ray tubes has been increased so that some tubes for continuous operation at 220 kv. rated at 20 milliamperes have an effective focal-spot size of 10x10 mm. In order to accommodate such large energies, the *actual* focal spot has been enlarged and is usually made rectangular or elliptical in shape. In order that the *effective* focal spot may still remain small, the target face of the tube is

formed at such an angle that the useful X-ray beam arises in a focal spot having a projected effective area which is square or circular in shape.

Self-rectifying, sealed-off X-ray tubes of 200 and 400-kv. capacities are being marketed. Effective focal-spot sizes as small as 5.5x5.5 mm. are available for work requiring high definition. Focal spots as small as this may carry 12 ma. at 220 kv. continuously. The efficiency of oil cooling has been increased by studies of oil and metals with the object in mind of increasing intimacy of contact between target backing and cooling oil.

Self-rectifying high voltage tubes employing a negatively biased grid near the cathode offer interesting possibilities of increasing the capacity as well as improving the useful quality of the radiation. The action of such a grid is similar to that in the simple three-element radio tube. Tube (plate) current does not flow until the voltage has reached a high value on the wave and, therefore, the production of useless low voltage X-rays is materially reduced. From the quality standpoint, the effective wave length of the radiation is shortened, and the maximum energy is shifted toward the shorter wave lengths. Thus, the radiographic efficiency of the tube is increased because the target of the tube is relieved of the load associated with the production of low penetration radiation. X-ray tubes are the subject of continual research—therefore increased voltages and capacities with decreased effective focal-spot size may be expected.

#### Protection Practice

As the penetrating power of X-rays has been increased and the use of the gamma rays of radium has become more common, it has been necessary to give more attention to the problem of adequate protection of personnel and photographic materials. The effect of X-ray and gamma ray radiation is cumulative, biologically as well as photographically. Any laboratory planning to start X-ray inspection or extend its original kilovoltage range would do well to consult the National Bureau of Standards Handbook, No. 20<sup>2</sup>. A similar handbook, No. 23<sup>3</sup> deals with the safeguards needed when radium work is to be undertaken.

The economies that may be observed in planning adequate protection have been studied and results tabulated for easy reference. L. S. Taylor<sup>3</sup> has made comparison of lead protection for 100-kv. to 600-kv. X-rays, and for gamma rays, with equivalent thicknesses of concrete, barium concrete, building

blocks and brick, indicating the relative cost of installations made during building construction and installations made after completion.

Radium protection investigations have been reported in an article by G. W. C. Kaye, W. Binks, and G. E. Bell<sup>4</sup> and more recently by E. H. Quimby<sup>5</sup>. These papers indicate the lead protection equivalents of iron, barium plaster, concrete, and red brick. Precautions in handling radium are discussed including practical tests which can be made to assure the safety of personnel.

Various techniques are employed to produce radiographs of the widely different materials encountered in industrial radiographic studies. Some refinements and additions to knowledge of technique have been made recently. H. E. Seemann<sup>6</sup> and V. E. Pullin<sup>7</sup> have investigated the problem of secondary radiation of industrial materials. When X-rays strike matter, some of their energy is re-emitted in the form of X-rays of similar or longer wave length. The various types of these X-rays are included under the term "secondary radiation." Since secondary radiation spreads in all directions, it is non-image forming and merely acts to produce a general fog over the film, lessening contrast and detail in the radiographic image. Seemann's findings indicate that the proportion of secondary radiation from aluminum and steel, when radiographed by direct X-ray technique, increases almost linearly with thickness, and that nearly half of this secondary radiation can be removed by the use of lead-foil screens in contact with the film. Secondary radiation increases somewhat with the voltage applied to the X-ray tube, but no important reduction of secondary radiation is possible by adjustment of kilovoltage within the range necessarily used for a given subject.

When the object radiographed does not cover the whole film, the areas of film outside the shadow may receive a very intense exposure, giving rise to halation from the X-rays and light diffusing into the image. To protect these outer film areas, it is customary to

cover them with lead, plastic barium clay, or an X-ray absorbing solution. C. D. Moriarty<sup>8</sup> has reported on the use of very fine metal shot for this purpose, which has the advantage of flowing freely so that it may readily be filled around irregular objects. Fig. 4 illustrates this method as it would be applied to round bar stock, one of the most difficult applications for which it may be used. It has been suggested that a lead mask be used to retain the shot and reduce the quantity needed. By keeping the volume of shot to a minimum, the total material contributing secondary radiation is reduced.

Another application is to fill in the surface irregularities such as exist on welded joints. These irregularities otherwise may be confusing in the radiograph and have little if any diagnostic importance. The composition of the shot may be selected to suit the material under examination. Moriarty (personal communication) suggests that in practice he has found it advisable to use copper shot about 0.010 in. in diameter. This size of shot pro-

duces no perceptible difference radiographically and is less susceptible to adhesion due to oil or moisture picked up from the subject than the smaller size previously recommended.

#### Use of Penetrameter

As evidence in the radiograph that a suitable exposure technique has been used, a penetrameter may be placed on the subject at a point representing the greatest thickness of material to be shown in that particular exposure. The penetrameter is a device, made of the same material as that on which it is to be used, having thicknesses representing small percentages of the total thickness of the subject. The details of penetrameter construction and the limitations of their use are the subject of considerable research and discussion. General considerations indicate that the penetrameter should always be located on the *tube* side of the subject in which position it most accurately indicates the ability of the radiographic technique to show small differences in thickness or X-ray absorp-

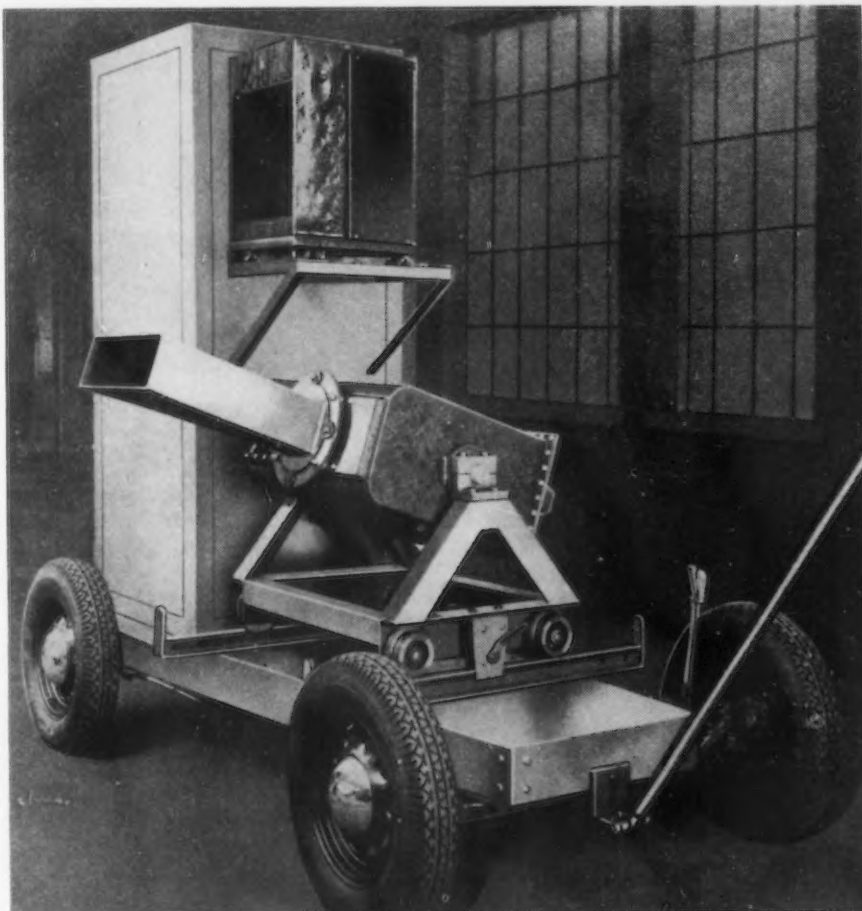


FIG. 2—A 220-kv. portable X-ray unit for inspection of industrial materials. Photo courtesy of General Electric X-Ray Corp.

<sup>4</sup>G. W. Kaye, W. Binks, and G. E. Bell, "The X-Ray and Gamma-Ray Protective Values of Building Materials," *Brit. Journal Radiol.*, 11, 676, 1938.

<sup>5</sup>E. H. Quimby, "Radium Protection," *Journal Applied Physics*, 10, No. 9, 604, September, 1939.

<sup>6</sup>H. E. Seeman, "Secondary Radiation in the Radiography of Aluminum, Steel, and Lead," *A.S.T.M. Proceedings*, 38, Part 2, 284, 1938.

<sup>7</sup>V. E. Pullin, "Radiography—An Aspect of Non-Destructive Testing," *Journal of the Institution of Electrical Engineers*, 84, No. 509, 535, May, 1939.

<sup>8</sup>C. D. Moriarty, "The Use of Metallic Shot in X-Raying Steel," *General Electric Review*, 109, June, 1938.



tion, for example, defects of small depth. The image of the penetrometer cannot be taken as an index of the minimum size flaw detectable but rather as an arbitrary estimate of the quality of the radiograph. H. H. Lester<sup>9</sup> has discussed some aspects of radiographic sensitivity in which penetrameters receive considerable attention.

G. E. Doan and S. Young<sup>10</sup> have pointed out certain geometrical similarities between gamma-ray radiography and solar eclipses and from

and therefore exposure times may be substantially reduced. The advisability of a small source diameter is shown, and for sharp shadows, the angle subtended between source and flaw should not exceed two degrees.

V. E. Pullin<sup>7</sup> reports that placing radium in a lead "focusing tunnel" 1-in. long with an aperture of  $\frac{3}{8}$ -in. diameter appears to project scattered radiation into the main beam of rays, and in so doing increases contrast. By the use of this tunnel he was able to show a hole  $\frac{1}{16}$  in. diameter,  $\frac{1}{8}$  in.

therefore be recorded sharply, while other planes within the specimen are moving relative to the film, and will be indistinct due to blurring. By suitable provision for choosing the correct difference in rate of travel of the film relative to the specimen, any plane may be recorded more sharply than other planes in the subject.

*Ed. Note:—Next week the author will conclude this discussion with data on the use of low voltage radiation, flexible calcium tungstate intensifying screens, a new type of developing solution, etc.*

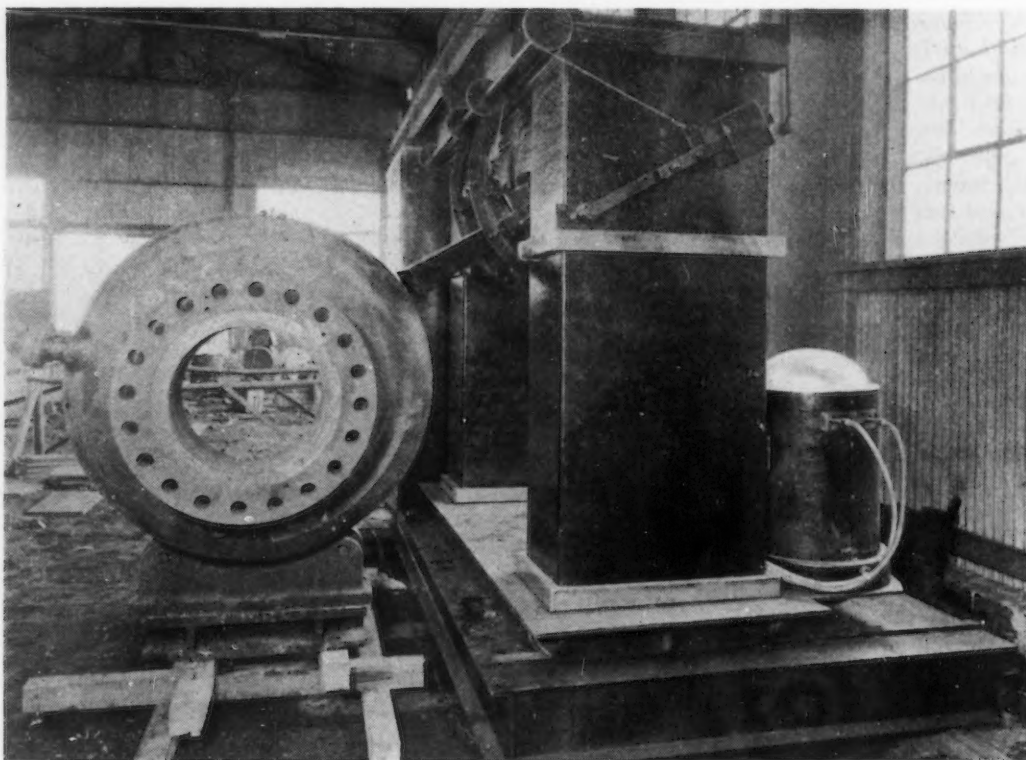


FIG. 3—A 400-kv. industrial X-ray machine capable of penetrating 5 in. of steel. Photo courtesy of Kelley-Koett Mfg. Co., Inc.

these observations derived an equation concerning the penumbral shadow. This formula makes possible calculation of the minimum source to film distance which will give satisfactory penumbral shadow registry and flaw detection sensitivity. Although the penumbral shadow density shades gradually into the density of the true shadow, within the limits set by this equation, the penumbral shadow will safely indicate the flaw. By using the penumbral shadow rather than the true shadow, the distances of source to flaw,

<sup>9</sup> H. H. Lester, "Some Aspects of Radiographic Sensitivity in Testing with X-Rays," A.S.T.M. Bulletin, No. 100, 33, October, 1938.

<sup>10</sup> G. E. Doan, and S. Young, "Gamma-Ray Radiography," A.S.T.M. Proceedings, 38, Part 2, 292, 1938.

deep through an added thickness of  $3\frac{7}{8}$  in. of metal. Without the tunnel he reports being able to show the hole through only  $2\frac{3}{8}$  in. of added metal.

In the same paper Pullin illustrates the experimental use of planar radiography. As the name implies, planar radiography is a method of producing a radiograph of a particular plane within a solid object. During an exposure, the specimen and the film are moved parallel to the axis of the X-ray tube, in the same direction, but at different rates, the film traveling slightly faster than the specimen. For a particular difference in the rate of travel of the film and specimen, a specific plane within the specimen will remain stationary relative to the film, and will

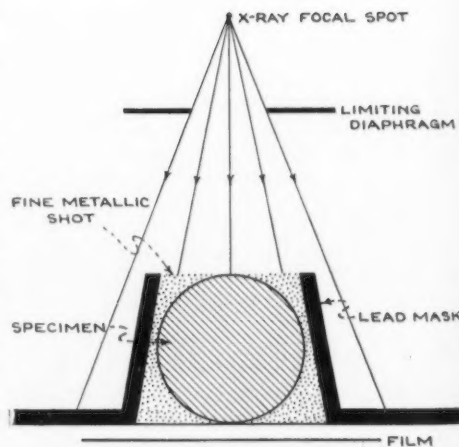


FIG. 4—Metallic shot technique for masking round bars.



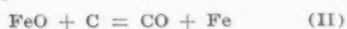
# Theory and Practice of BASIC OPEN HEARTH SLAG CONTROL

By F. M. WASHBURN and  
W. O. PHILBROOK

*Assistant Superintendent of Metallurgy  
and Inspection, and Research Metallur-  
gist, Respectively, Wisconsin Steel  
Works, International Harvester Co.*

TO intelligent and accurate slag control goes the credit for the greatly improved steel uniformity of today. Therefore, most timely are the simplification and clarification of these control problems. Last week the authors dealt in detail with the functioning of the basic open hearth, and gave data on slag formation, transfer of iron oxides, and measurements of oxidizing power. Herein, in the second section of this four-part article, the authors describe the elimination of carbon from the bath, departure from equilibrium, rate of oxidation of slag and bath, and the effect of temperature.

**ELIMINATION OF CARBON FROM THE BATH:** The FeO present in the steel bath reacts with carbon in accordance with the following reaction:



The CO formed escapes as a gas, giving rise to the "carbon boil," and, as

\*While this reaction is strictly reversible, it can proceed only in one direction in the open hearth furnace because it is not a closed system, in the thermodynamic sense, but FeO is constantly introduced into the system and CO withdrawn by the flame.

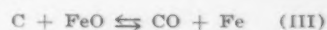
<sup>1</sup>C. H. Herty, Jr., C. F. Christopher, H. Freeman, and J. F. Sanderson, "The Physical Chemistry of Steel-Making. The Control of Iron Oxide in the Basic Open-Hearth Process," Cooperative Bulletin 68 (1934), Mining and Metallurgical Advisory Board, Carnegie Institute of Technology, Pittsburgh.

previously stated, aids greatly in the oxygen transfer cycle by its stirring action on both bath and slag. This reaction goes on continuously with the removal of both carbon and FeO. If no further oxygen were introduced from the slag, the reaction would eventually reach equilibrium, and the elimination of carbon would cease. It is impossible to stop the transfer of oxygen from the slag, and it is therefore impossible to reach equilibrium in the bath as long as any carbon is present to react.

By slowing down the rate of transfer of oxygen from the slag to the bath by means of slag control, it is possible to permit the carbon-FeO re-

action to proceed more nearly to equilibrium, and thus to reduce somewhat the oxide content of the bath. The application of this principle to slag control must be handled with caution because the transfer of oxygen from the flame to the slag is not so easily slowed down, and any decrease in the rate of transfer of oxygen from the slag to the bath will therefore result in a building up of oxygen in the slag, which under certain conditions may be rather suddenly transferred to the bath and not only thus defeat the purpose of the manipulation, but may even result in a higher content of oxygen in the bath than would otherwise have existed.

The reaction between carbon and FeO in the bath is a reversible chemical reaction\*, and as such obeys the laws of chemical equilibrium. This reaction and the equilibrium expression are as follows:



$$\frac{P_{\text{CO}} \times (\text{Fe})}{(\text{C}) \times (\text{FeO})} = K_e \quad (\text{IV})$$

As explained by Herty<sup>1</sup>, Chipman

and Samarin<sup>5</sup>, and others, the pressure of CO is approximately constant, and has been estimated to be slightly over one atmosphere. The activity of iron may likewise be assumed to be constant and approximately unity for practical purposes. Combining these two terms in the constant, a simpler expression may be written:

$$(C) (FeO) = m \quad (V)$$

Independent determinations of the value of  $m$  by Herty<sup>1</sup>, et. al., Chipman and Samarin<sup>5</sup>, Vacher<sup>6</sup>, and Schenck, Riess and Brüggemann<sup>7</sup>, have placed this constant at about 0.011 at open hearth temperatures, where the concentrations of carbon and of FeO are expressed as weight per cent.

Equation (III) and the others derived from it are not entirely correct, because it is known that some carbon dioxide is also formed by the reaction between carbon and FeO. However, the amount of CO<sub>2</sub> in the gas in equilibrium with the steel is less than 5 per cent of the CO content above 0.05 per cent carbon<sup>8</sup>, and it will in no way affect the application of these equations for the purposes of this paper if the formation of CO<sub>2</sub> is disregarded.

#### Departure from Equilibrium

The latest calculations of the equilibrium value,  $m$ , by Chipman<sup>5</sup>, together with the average curve of results obtained from actual heats, are shown in Fig. 3. The points for this curve were all obtained from quality killed steels just before the heats were blocked and after an attempt had been made to approach equilibrium conditions. The oxygen content of the bath, calculated as FeO, was obtained by a method of sampling now known to the industry as the "bomb test," developed by K. C. McCutcheon<sup>9</sup>.

The curve obtained from actual heats is approximately parallel to the theoretical equilibrium curve and is displaced from it by an amount corresponding to about 0.04 per cent FeO at 0.30 per cent carbon and above, and up to 0.06 per cent FeO at 0.10 per cent carbon. This displacement of the curve of actual results represents the oxygen in excess of the equilibrium

<sup>5</sup> John Chipman and A. M. Samarin, "Effect of Temperature upon Interaction of Gases with Liquid Steel," Transactions of the American Institute of Mining and Metallurgical Engineers, Iron and Steel Division, 125, 331-45 (1937).

<sup>6</sup> H. C. Vacher, "The System Liquid Iron-Carbon Oxides," Bureau of Standards Journal of Research II, 541-51 (1933).

<sup>7</sup> H. Schenck, W. Riess and E. O. Brüggemann, "Über die Geschwindigkeit und die Gleichgewichtskonstante der Kohlenstoffreaktion bei der Herstellung flüssigen Stahls," Zeitschrift für Electrochemie 38, 562-8 (1932).

<sup>9</sup> K. C. McCutcheon, "Bath Samples for Oxygen Determination," 1938 Open Hearth Proceedings, 143-49, American Institute of Mining and Metallurgical Engineers.

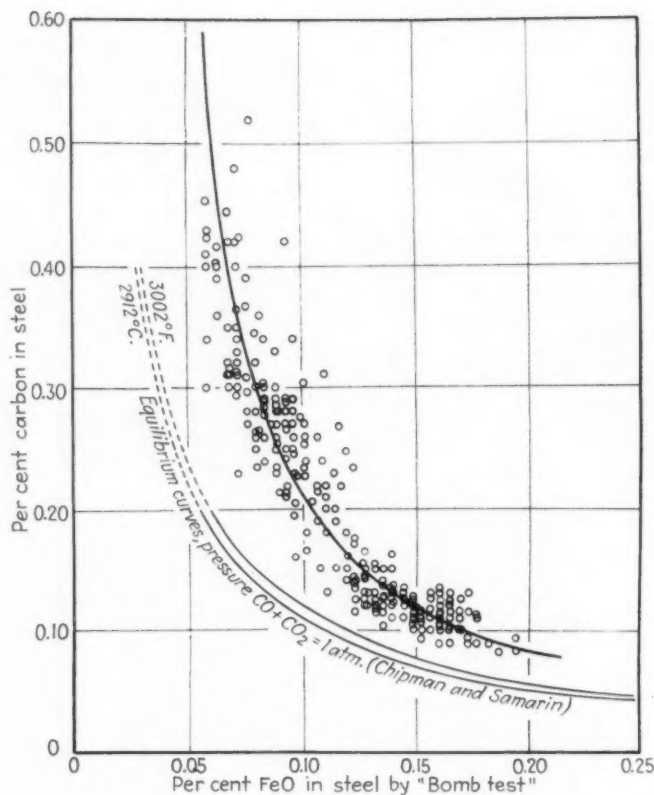


FIG. 3—Relation between carbon and FeO in steel. Data from 300 heats of quality killed steel just before blocking.

value which is required to force the carbon-FeO reaction, or the carbon boil, to take place at a rate great enough to keep pace with the slowest rate of introduction of oxygen from the slag which can be attained in practice.

The effect upon the rate of carbon elimination of this excess of FeO, or, stated in a different way, the difference between the actual (C) (FeO) product and the equilibrium value, is expressed mathematically by the equation derived by Herty<sup>1</sup> by the application of the chemical laws governing rates of reaction:

$$-dC/dO = k [(C) (FeO) - m] \quad (VI)$$

where  $-dC/dO$  represents rate of change of carbon concentration with time (negative in sign because carbon is lost),  $k$  is a rate constant for a given temperature, (C) and (FeO) represent the actual weight percentages of these constituents in the bath at any instant, and  $m$  is the equilibrium value. Since  $k$  and  $m$  are constant for a given temperature, the rate of carbon drop is therefore a linear function of (C) (FeO).

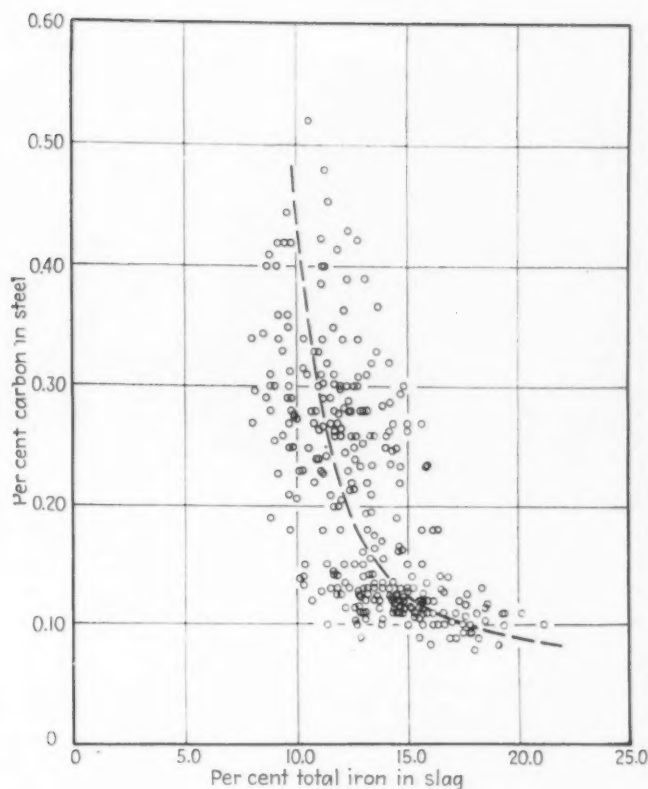
If the rate of oxygen transfer from the slag to the bath is greater than the practical minimum, the FeO content of the bath will increase. The higher FeO content will cause an increase in the rate of reaction between carbon and FeO, or a more violent carbon boil. This, in turn, will remove oxygen from the bath more

rapidly and will partly compensate for the increased rate of transfer of FeO from the slag. However, since a higher value for the (C) (FeO) product is necessary to sustain a more vigorous carbon boil, it is impossible to attain as low a content of FeO in the bath, by means of the carbon reaction alone, with a rapid transfer of oxygen from the slag as with a slower rate of oxidation.

As just explained, slowing down the rate of transfer of oxygen from the slag to the bath by slag control leads to a building up of oxygen in the slag, because the rate of oxidation by the flame continues at a nearly constant rate. If iron oxide accumulated in the slag in this way, or by additions of ore or mill scale, is suddenly released to enter the bath, the rate of transfer of oxygen to the bath will become greater than the rate of introduction of oxygen to the slag from the flame. This will cause the iron oxide in the slag to decrease, and at the same time the FeO thus introduced into the bath at a very rapid rate will be continuously removed by an accelerated reaction.

In other words, the iron oxide content of the slag will be reduced by the carbon in the bath. This is the means of action on the bath of mill scale, which dissolves in the slag.

**FIG. 4—**Relation between carbon in steel and total iron content of slag. Data from 300 heats of quality killed steel just before blocking.



Lump ore probably reacts partly in this way, but primarily by direct solution in the bath. The same effect is obtained if a heavy, viscous slag, which reacts sluggishly with the bath because of resistance to convection, is thinned by the addition of spar. Addition of silica to a slag will reduce the basicity and decrease the viscosity with the same effect as spar, but in addition it will release some  $\text{Fe}_2\text{O}_3$ , which may have been held as ferrites by excess lime, to resume an active part in the oxygen cycle. An increase in the active iron oxide content of the slag in this way has the same effect as the addition of ore corresponding to the amount of  $\text{Fe}_2\text{O}_3$  thus liberated.

When  $\text{FeO}$  is transferred to the bath faster than it is formed in the slag, the rate of transfer must slow down as the iron oxide content of the slag is diminished, until eventually the rate is again reduced to the rate of formation of  $\text{FeO}$  in the slag. Velocity of carbon elimination will likewise slow down to keep pace with the rate of transfer of  $\text{FeO}$  to the bath. The  $\text{FeO}$  introduced into the bath will have been removed by the carbon to a value which is in "equilibrium" for the rate of carbon-drop prevailing. The net result is that the active iron oxide content of the slag is determined by the carbon content of the bath if the slag is sufficiently fluid

to give proper convection and uniform rates of oxygen transfer.

Due to the formation of inactive compounds of  $\text{Fe}_2\text{O}_3$  in highly basic slags, as previously stated, the total iron content of such slags will not be directly dependent upon the carbon content of the bath to the same extent as is  $\text{FeO}$  in the steel. This is illustrated by the scattering of points in Fig. 4, where total iron content of the slag is plotted against carbon content of the bath, compared with the curve for the relationship between carbon and  $\text{FeO}$  in the bath given in Fig. 3.

Over any period of time, the average rate of removal of oxygen from the bath must be somewhat less than the rate of introduction of oxygen from the flame, because as carbon is removed irreversibly from the system as carbon monoxide gas, the  $\text{FeO}$  level necessary for further removal of carbon increases in accordance with equation (V), and Fig. 3, and part of the oxygen introduced by the flame at any instant must remain permanently in the system to fulfil this requirement. As carbon content drops below 0.20 per cent, the concentration of  $\text{FeO}$  required to cause further carbon elimination increases rapidly until it becomes an appreciable percentage of the  $\text{FeO}$  formed per unit time, and consequently the rate of carbon drop

diminishes markedly, until below 0.05 per cent carbon it is very slow indeed.

#### Rate of Slag Oxidation

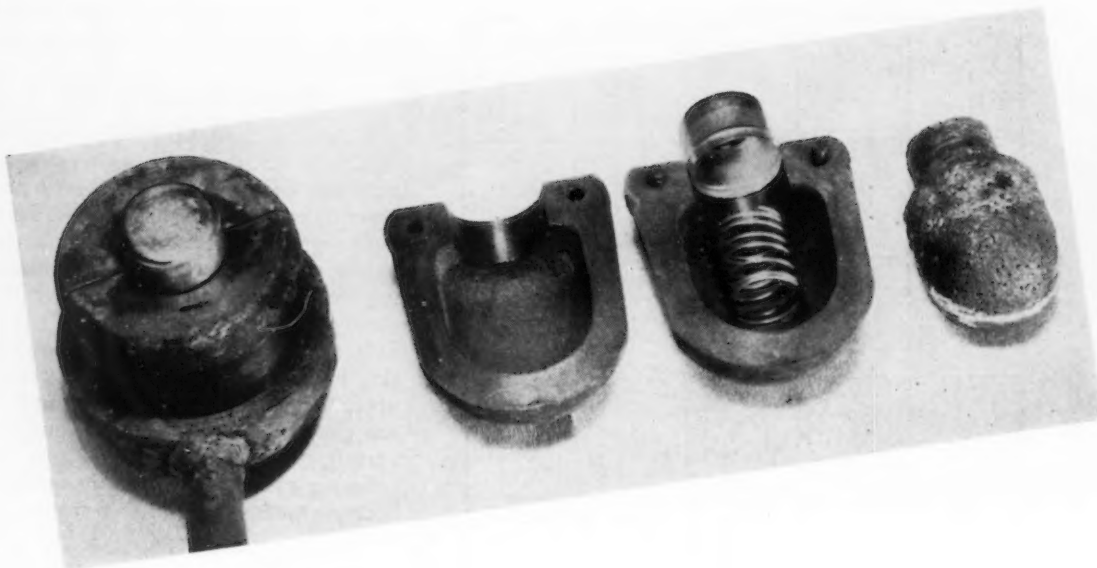
Much has been said about rates of oxidation of the slag and rates of transfer of  $\text{FeO}$  to the bath, and several assumptions have been made with regard to these rates, without any extensive presentation of the governing conditions. Consideration of the chemical principles involved will show, first, that the rate of oxidation of the slag by the flame is dependent directly upon the partial pressures of oxidizing gases,  $\text{O}_2$ ,  $\text{CO}_2$ , and  $\text{H}_2\text{O}$ , and inversely upon the concentrations of reducing gases,  $\text{CO}$  and  $\text{H}_2$ , in the furnace atmosphere at the slag-gas interface.

The total concentrations of oxidizing gases in comparison with inert nitrogen, and the relative proportions of  $\text{CO}_2$  and  $\text{H}_2\text{O}$ , will vary with the fuel burned, and as one example, it has been found by experience that a mixed blast furnace and coke oven gas flame is less highly oxidizing than a flame obtained from fuel oil atomized by steam. It has already been stated that the temperature level necessary to open-hearth operation requires complete combustion of the fuel, so that the concentrations of carbon monoxide and hydrogen are limited to the small amounts formed by dissociation of carbon dioxide and water vapor at the temperature of the flame.

Ordinarily a slight excess of air is carried to insure complete combustion of the fuel and  $\text{CO}$  from bath reactions, but good practice limits this to 5 to 10 per cent, corresponding to 1 to 2 per cent of oxygen in the waste gas. It could even be shown that the composition of the flame directly at the slag-gas interface is somewhat dependent upon port design, manner of injection of the fuel, drafting, and pressure within the furnace, and actual experience indicates that rate of oxidation is to some extent a characteristic of individual furnaces, even with the same fuel. In effect then, given a particular furnace and fuel, the open-hearth operator has very little control over the oxidizing power of the flame itself.

The rate of oxidation of the slag by the flame is, secondly, directly proportional to the concentration of  $\text{FeO}$  in the slag at the slag-gas interface, and inversely proportional to the concentration of  $\text{Fe}_2\text{O}_3$ , which also implies a rate of diffusion of  $\text{Fe}_2\text{O}_3$  from the interface into the lower layers of the slag and its replacement by more  $\text{FeO}$ . As has just been shown, the



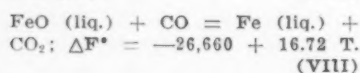
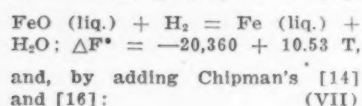


Bomb test mold  
and test.

concentration of active iron oxides in the slag is determined by the carbon content of the bath, where the slag is sufficiently fluid. The fluidity of the slag and the degree of agitation, which is closely related to the fluidity, likewise control the rapidity of replacement of  $\text{Fe}_2\text{O}_3$  by more  $\text{FeO}$  at the slag-gas interface, and thereby govern the ratio of  $\text{FeO}$  to  $\text{Fe}_2\text{O}_3$  for a given concentration of total iron in an active condition in the slag.

It may be seen, therefore that about the only control the furnace operator has over the iron oxide factor in rate of oxidation by the gas is through the regulation of slag viscosity. A fluid slag will give a rapid change of iron oxides at the slag surface exposed to the flame, and thus give a rapid rate of oxidation, with resultant shortening of the refining time, but will not permit any excessive accumulation of iron oxide in the slag. A viscous slag, on the other hand, will permit the  $\text{Fe}_2\text{O}_3$  content of the upper surface of the slag to build up, and this will have a very slight retarding effect on the rate of formation of more  $\text{Fe}_2\text{O}_3$ .

A rough qualitative indication that this retarding effect can be only very slight is obtained as follows: From Chipman's data<sup>3</sup>, the equations below may be obtained. By adding Chipman's expressions [12] and [14] and also by subtracting [15] from [8]:



Through the relationship  $\Delta F^\circ = -4.574 T \log K$ , the equilibrium constants for these reactions may be computed.

$$\frac{(\text{H}_2\text{O})}{(\text{H}_2)(\text{FeO})} = K; \log K = \frac{4451}{T} - 2.30 \quad (\text{IX})$$

$$\frac{(\text{CO}_2)}{(\text{CO})(\text{FeO})} = K; \log K = \frac{5829}{T} - 3.65 \quad (\text{X})$$

The mol fraction of  $\text{FeO}$  active in the slag can probably be substituted in these expressions without appreciable error, at least for the present purpose. At 1600 deg. C. the constant for reaction (VII) is 1.19, and the ratio of steam to hydrogen,  $(\text{H}_2\text{O})/(\text{H}_2)$ , in equilibrium with 0.1 mol fraction of  $\text{FeO}$  in the slag is 0.119; with 0.2 mol ratio of  $\text{FeO}$ , the steam-hydrogen ratio is 0.238. Likewise, the constant for reaction (VIII) is 0.287, and the ratios of  $(\text{CO}_2)/(\text{CO})$  in equilibrium with 0.1 and 0.2 mol fractions of  $\text{FeO}$  in the slag are 0.029 and 0.057 respectively. Since the actual ratios in the flame, with complete combustion, are large whole numbers, of the order of 50 for  $(\text{CO}_2)/(\text{CO})$ , the conditions are far from equilibrium and variations of  $\text{FeO}$  content within the usual range would have little effect on the oxidizing power of the gas. These figures should not be construed as any more than a qualitative indication because, while equations (VII) and (VIII) represent the net reactions for the formation of  $\text{FeO}$  in the slag through the cycle previously described, they do not express the reactions at the slag-gas interface.

#### Oxidation of Bath

The factors affecting rate of transfer of  $\text{FeO}$  from the slag to the bath are roughly analogous to those governing the oxidation of the slag by the

flame. The rate of oxidation of the bath is directly proportional to the oxidizing power of the slag, or the concentrations of  $\text{FeO}$  and of  $\text{Fe}_2\text{O}_3$  available for the oxygen cycle, at the slag-metal interface, and inversely proportional to the concentration of  $\text{FeO}$  in the steel.

It is of course necessary that iron oxides be able to move freely from the body of the slag to the slag-metal interface to replace those entering the steel, and that  $\text{FeO}$  at the interface be transferred into the lower parts of the steel bath so that the concentration of  $\text{FeO}$  at the interface may not become great enough to slow or stop the process of solution from the slag.

A fluid slag is necessary for proper convection in the slag, and will promote rapid solution of  $\text{FeO}$  in the steel at the interface. Rapid solution of  $\text{FeO}$  in the steel gives rise to a more violent carbon boil, which agitates the bath and helps carry the  $\text{FeO}$  down by convection. The area of the interface is also increased by the disturbance caused by the rising bubbles of carbon monoxide. The viscosity of the slag, therefore, exerts the major influence on the rate of oxidation of the bath by the slag.

#### Effect of Temperature

Temperature is a very important factor in open hearth operations because it influences both the limiting equilibrium conditions and the rates at which reactions proceed in the direction of such equilibria. The effects of temperature on open hearth reactions are understood only qualitatively by most practical furnace men and are very difficult to demonstrate or apply

Bomb test molds  
ready for use.



in an exact manner at the present time, because there is still no reliable way of determining the exact temperature level of the steel in the furnace. Several very promising methods of measuring bath temperatures in the open hearth furnace, employing both radiation and thermo-electric effects, are now in process of development, but they are as yet neither in common use nor readily available to the industry.

The effect of temperature on the (C) (FeO) equilibrium product,  $m$ , has been calculated reliably by Chipman and Samarin<sup>5</sup>, who showed that increasing temperature increases slightly the value of  $m$ . In other words, as the temperature increases, the reducing power of the carbon in the bath toward the dissolved FeO decreases. This effect is rather small, amounting to only about 8 per cent per 50 deg. C. (90 deg. F.) rise in temperature, and in so far overshadowed by the influence of temperature on other reactions that it may be ignored for practical purposes. The solubility of FeO in the steel increases rather rapidly with rising temperature, and Herty<sup>1</sup> found that the value of the FeO distribution coefficient increases markedly with temperature. The increased FeO transfer to the bath from this cause would more than offset the effect of an increased value of  $m$  on the rate of carbon elimination from the bath.

Inspection of the equations and thermodynamic functions for the oxidation of the slag by the flame (small type indented) will show that the values of the constants become smaller with increasing temperature. This

means that the ratios of  $\text{CO}_2/\text{CO}$  and of  $\text{H}_2\text{O}/\text{H}_2$  in equilibrium with a given oxygen content of the slag decrease, or conversely, the oxidizing power of a flame rich in  $\text{CO}_2$  and  $\text{H}_2\text{O}$  increases as the temperature rises. Higher temperature would also increase the fluidity of a slag of given composition. All in all, then, it may be seen that higher temperatures of the slag and bath should increase the rate of transfer of oxygen from the flame to the slag, thence to the bath, and thereby increase the rate of carbon elimination.

From the standpoint of practical open hearth operation, it is more pertinent to view the question of temperature from a different angle. Successful operation requires that a comparatively high temperature level, depending somewhat upon the carbon and alloying content and the type of steel, be attained before the heat may be tapped. The melter is much more interested in knowing how to attain this necessary temperature level most rapidly, than in knowing the effect of temperature upon the furnace reactions.

Heating in the open hearth furnace is done in a most inefficient manner, namely, from the top down and through an insulator, the slag. Every effort should therefore be made to facilitate the process. It has now been firmly established, both by practical operation and theoretical computation, that the greater part of the heat transfer from the flame to the bath after the heat is "under cover" is through radiation from the flame. A luminous flame of high radiating power is therefore advantageous during the refining period. Methods for

obtaining such a flame with various fuels are beyond the scope of this paper, but are generally understood in the industry.

Application of the Stefan-Boltzmann law to the open hearth furnace provides that the transfer of heat from the flame per unit of slag surface area is proportional to the difference between the fourth power of the temperature of the radiating body of the flame and the fourth power of the temperature of the upper surface of the slag. Rapid heat transfer requires that heat be transmitted readily from the upper surface of the slag to the body of the slag and to the bath, in order to keep the temperature differential between flame and slag surface as great as possible. Heat is transferred through the slag and bath by convection and conduction, with convection being the more important, especially in the slag where thermal conductivity is low.

Establishment of convection currents requires a mobile, or fluid, slag. This also gives rapid FeO transfer, thus creating a vigorous carbon boil which stirs both steel and slag and thereby assists tremendously in the convection process. Aside from regulating flame luminosity, the most potent means at the melter's control of promoting rapid heat transfer from the flame to the bath is the maintenance of a fluid slag for as much of the refining period as possible.

*Ed. Note:—Next week the authors continue with a summary of the process of carbon elimination, elimination of silicon, elimination of manganese, and removal of phosphorus.*

By

F. M. HEWITT

# *Automatic Lubrication*

**M**OST of the manufacturers of products utilizing centralized pressure-lubrication, automatically metered, also employ a similar lubricating scheme for the production machines making the products. Perhaps the experience with automatically-lubricated production machinery may have induced the manufacturer to incorporate automatic lubrication in the product design. Or, perhaps the results obtained from automatically lubricating the product resulted in a specifying of similar lubrication for the production machines. Somewhat

like the chicken-and-egg sequence, it is hard to determine which came first.

Most such manufacturers are of the opinion that automatic, metered-feed oiling systems take lubrication out of the hit-or-miss category and place it under positive control. In so removing the human element lubrication worries are minimized.

In many instances automatic force-feed lubrication has introduced various economies into machine use. Operating efficiency and machine life are raised, and shutdowns for machine re-

pair are decreased along with maintenance costs. Many a modern high-speed precision machine now requires automatic lubrication as an essential part of design. And, in a manufactured product, such a lubricating system eliminates servicing of the product in many cases, and, in others, makes servicing much easier and less wasteful of time—where, for example, service men call regularly on customers to check installations.

One plant using automatic lubrication in production machines and prod-

FIG. 1—Surface grinder lubricated by Bijur "one-shot" system.

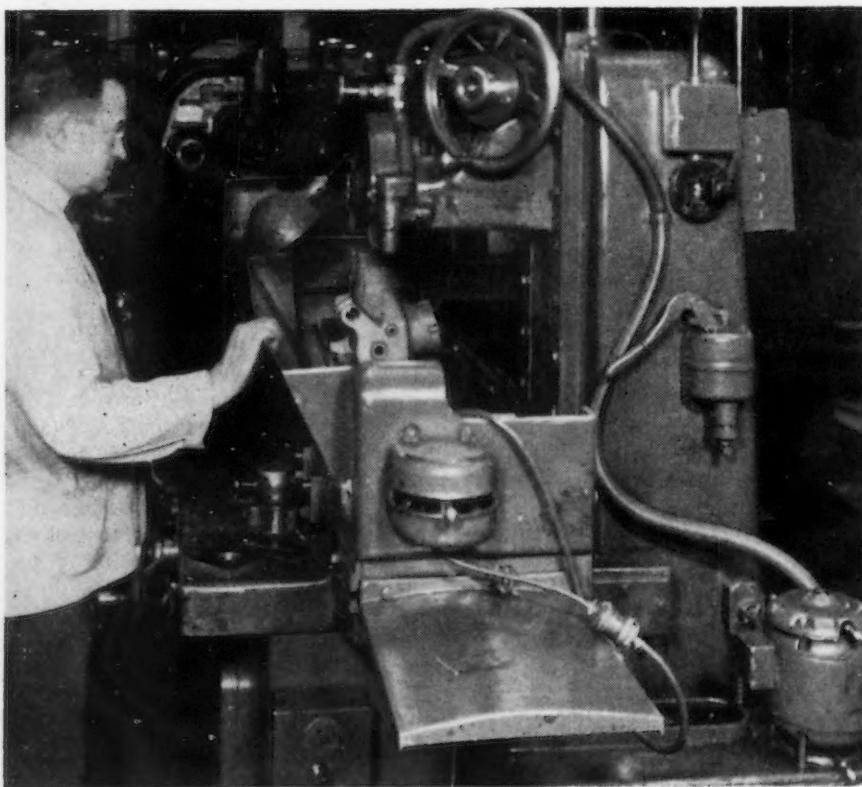
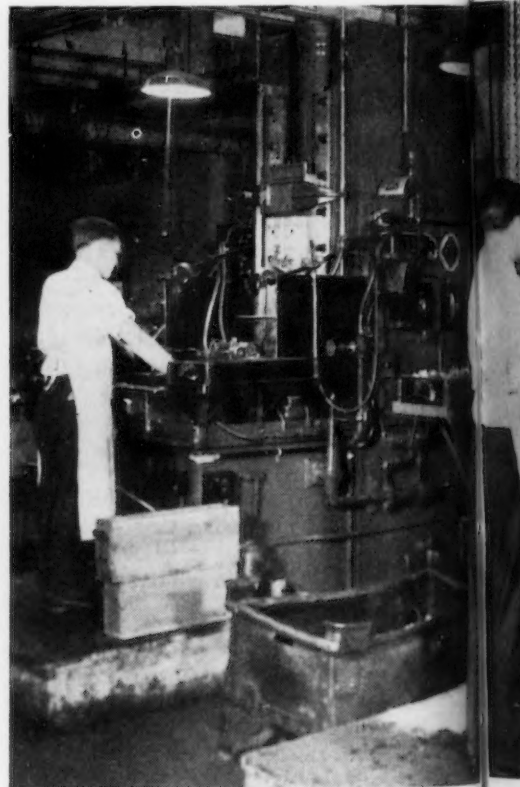


FIG. 2—Single ram surface broaches using "con"





# *of PRODUCTION MACHINES...*

uct alike is International Business Machines Corp., Endicott, N. Y. A surface grinder (Fig. 1), used in machining parts for models and experimental machines, has an unobtrusive automatic lubricating system—it is a pump-and-reservoir unit of a "one-shot" lubricator. A simple movement of the lever raises the pump piston and compresses a spring. With the automatic return of the piston, a predetermined volume of clean-filtered oil is delivered under pressure to the distribution system—a single feedline of small-diameter tubing having

branches at various junctions. Meter-units on the branched line then apporportion to the bearings the exact quantity of oil each bearing requires, according to its size, speed and load. This metered feed is entirely automatic, without lag, and any changes in the temperature and viscosity of the oil are automatically compensated for. Some 25 bearings (for the entire machine except the spindle) thus are lubricated in an instant. Each is served by its own individual meter-unit, which needs no adjustment at any time.

In another part of the I. B. M. plant, a pair of 5-ton single ram surface broaches (Fig. 2) are employed in broaching magnet yokes used in all electric accounting machines and electrical horizontal sorting machines. Each broach is lubricated by a "continuous" type of automatic lubricator.

In both "continuous" and "high-pressure" cyclic types, the lubricator pump is operated automatically by a simple mechanical drive from a reciprocating or rotating part of the machine. The lubricating cycle for a

using "continuous" type of automatic lubrication.

FIG. 3—Thread grinder provided with automatic lubricating system.

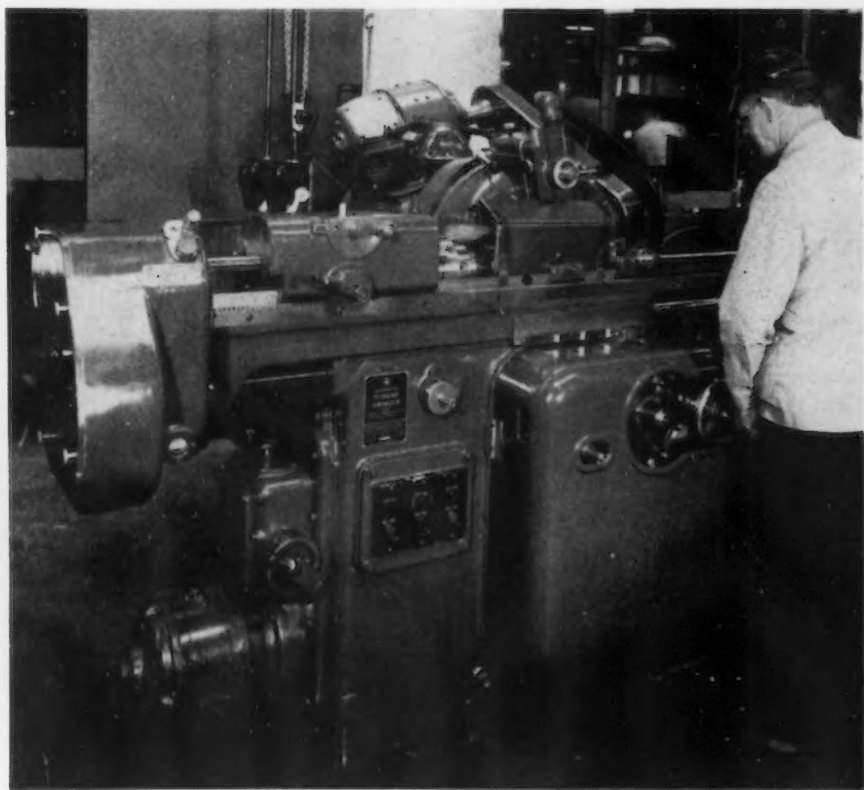
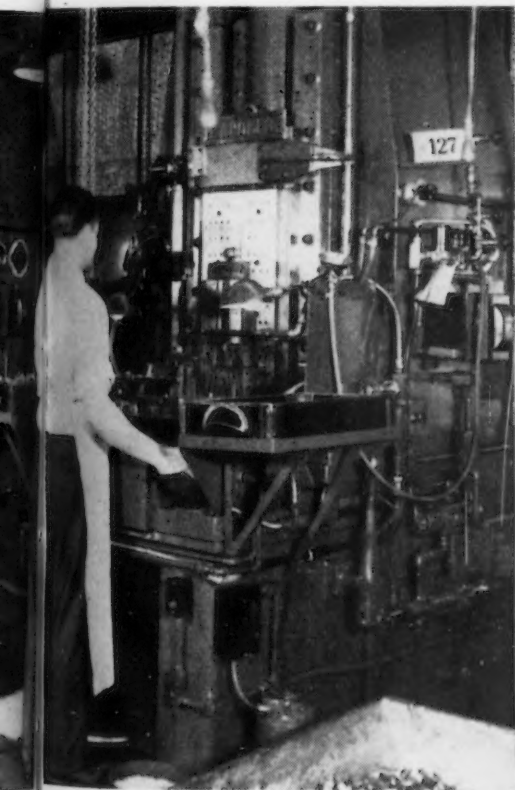




FIG. 4—Surface grinder equipped with Bijur "one-shot" automatic lubrication by I.B.M.

"high-pressure" lubricator is controlled by a positively driven cam. (Hydraulically-driven automatic lubricators also are now available for hydraulically operated machines.)

Another "continuous" type automatic lubricator is utilized by the thread grinder (Fig. 3) which grinds worm threads from the solid in shafts for electric sorting machines. The machine which grinds a triple thread worm, has from 30 to 35 operating bearings and slides lubricated by its automatic system.

In the apprentice school, where high school graduates are trained for jobs in the I. B. M. plant, all kinds of turning are done on a lathe which must withstand a lot of abuse. Its bearings are protected, however, by two automatic lubricators of the "continuous" type. One, driven from the bull gear,

lubricates the spindle bearings in the headstock. The other, installed in the apron, lubricates apron, bed ways and cross slide dovetail. Where intervals of oil-feed and other lubricating requirements (including the isolated position of some machine parts) differ quite widely, it is usually advisable to use more than one lubricator, although ordinarily any number of bearings are served by one automatic lubricator on a machine—no matter what the location of the bearings may be, or their difference in size or type.

The success of automatic lubrication of the I. B. M. Alphabetic Interpreter, where some 42 bearings are lubricated by a "one-shot" system—made standard equipment for the Interpreter in 1936—led directly to the automatic lubrication of many special production machines in the plant. It also encouraged the repair department to embody such lubricating equipment in all production machinery being rebuilt—as, for example, the surface grinder shown in Fig. 4, on which the installed "one-shot" lubricator takes care of 25 bearings automatically. Installation of the automatic lubricating systems proved a relatively simple procedure, although for greatest efficiency it is desirable to have the original ma-

chine designed with automatic lubrication in view.

Ease of handling and the neatness and compactness of installation possible, are suggested by Figs. 5 and 6, the former being an I. B. M. tube-bending board, and the latter a sub-assembly operation in connection with the installation of automatic lubricating equipment on electric accounting machines. The actual time required for this installation is  $3\frac{1}{2}$  hr.

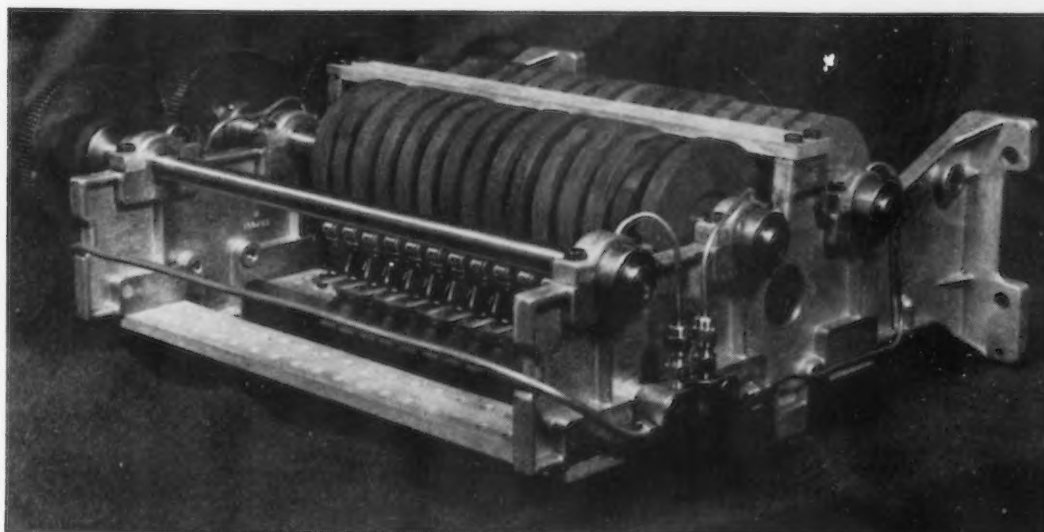
The lubricator pump-and-reservoir unit may be installed at any level on the machine, relative to the positions of the bearings. Feedlines are inconspicuous, requiring little space. They readily are concealed within the casings of streamlined machines, for instance—and with automatic lubrication there is no need to make adjustment of any parts of the system, hidden or otherwise.

Used on production machinery, automatic lubricating equipment provides safety for the operator as well as for the machine. Bearings even in the most difficult, remote parts of the machine are oiled automatically while the machine is in operation—which is the time when a machine really needs its lubrication. Since the automatic lubricating system employed by I. B. M. is a "closed" system, there is no drain of



FIG. 5—Tube bending board for preforming feedline tubing.

FIG. 6—Example of feedline sub-assembly used in I.B.M. electric accounting machine.



oil from the line to create fire risks or hazards from oil-slippery floors.

Automatic lubricating systems eliminate many wastes, as for instance the following:

Wastes of time—oiling-time; delays in machine starting; slowing-up machine speed; shut-downs that throw

production schedules and deliveries out of kilter.

Waste of lubricant.

Waste of power.

Waste of materials and parts—used in machine repairs caused directly or indirectly by bearing seizures and freeze-ups.

Waste through spoilage (on machines carrying paper or fabrics that may come in contact with unregulated oil-feed).

Also machine operators, rid of the task of hand oiling, are able to concentrate on productive work and often are spared considerable fatigue.

## Large Tanks Rubber Lined

**F**OUR large pickling tanks for use in the manufacture of steel are currently being rubber lined by the Plioweld process in the Goodyear Tire & Rubber Co., Akron, Ohio, factory. The completed tanks will be 80 ft. long, 7 ft. 4½ in. wide, and 5 ft. 2½ in. deep. Problems of handling and shipping require each tank be built in two 40-ft. sections.

The rubber lining, which will protect the steel tanks from the corrosive effects of chemicals used in the pickling process, involves use of 3300 lb. of rubber for each of the four tanks and 1600 lb. of rubber for the cover sections of each tank.

After the rubber lining has been applied to the tank sections, as illustrated in the accompanying photograph, each section is vulcanized in a large 15-ft.

diameter vulcanizing heater installed in the Goodyear Akron Plant No. 3 expressly for large jobs of this type. The vulcanizing operation of an entire unit is thus carried out with uniformity.

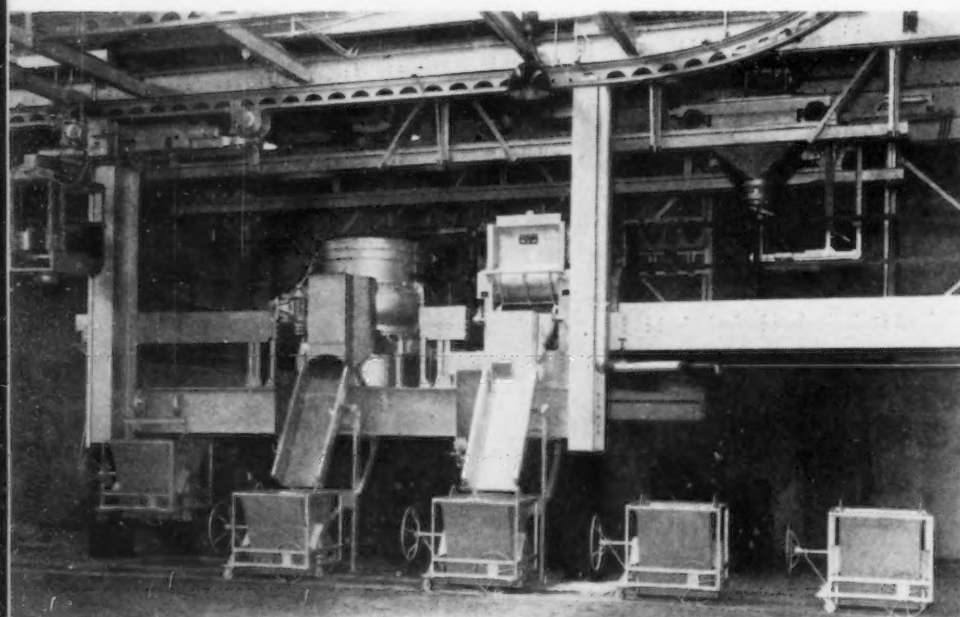
Delivery of completed sections is being made by tractor-trailer, each unit with its cover sections comprising a complete load.







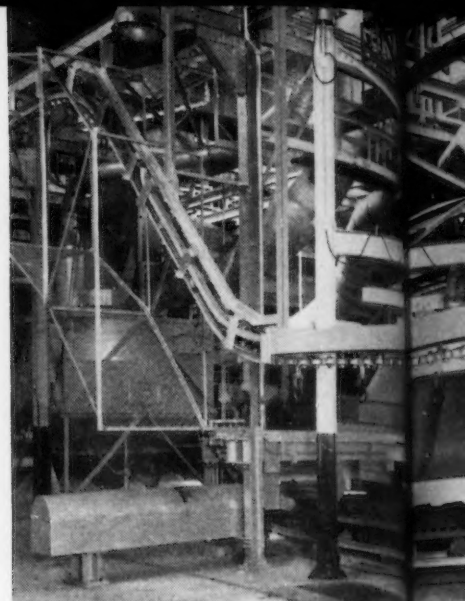
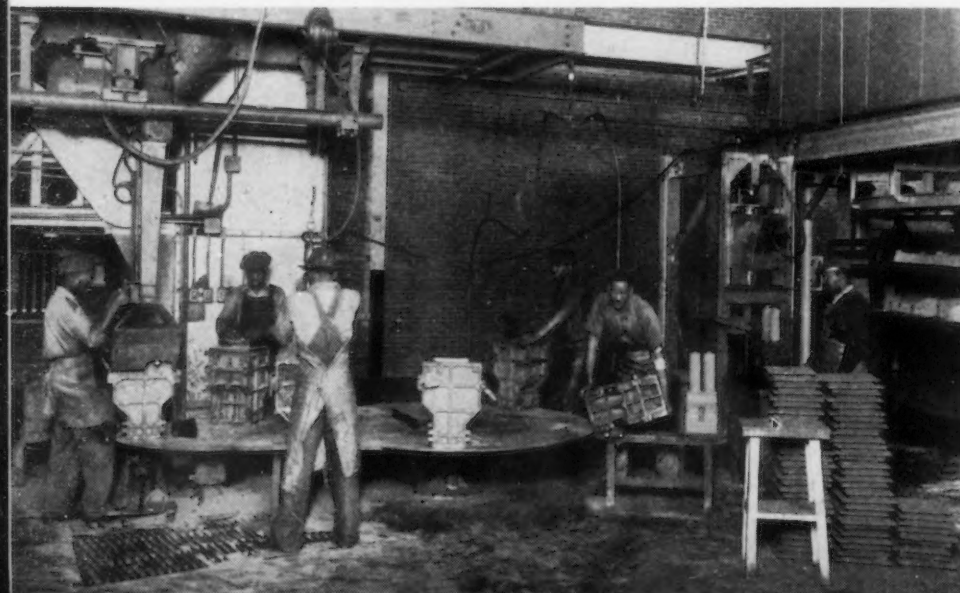
**FIG. 1**—The castings are born in this raw material yard, located adjacent to a railroad siding. Beneath the coke and limestone bins seen in the foreground is a merry-go-round carrying charging buckets past the loading stations located beneath the bins; Thence into the plant where the charges are deposited in the cupola via mechanical chargers.



**FIG. 2**—The core sand mixing platform contains a Beardsley & Piper Speedmuller and a Baker-Perkins mixer. Sand mixtures are delivered to the mixers through an automatic weigh lorry and the mixed product is distributed in hoppers carried by overhead monorail cranes.

o o o

**FIG. 3**—High production cylinder-block barrel cores are made on sandslingers, smaller cores are knocked out on core blowers and bump-roll-over machines take care of miscellaneous cores. Illustration shows barrel cores being made on a Beardsley & Piper slinger.

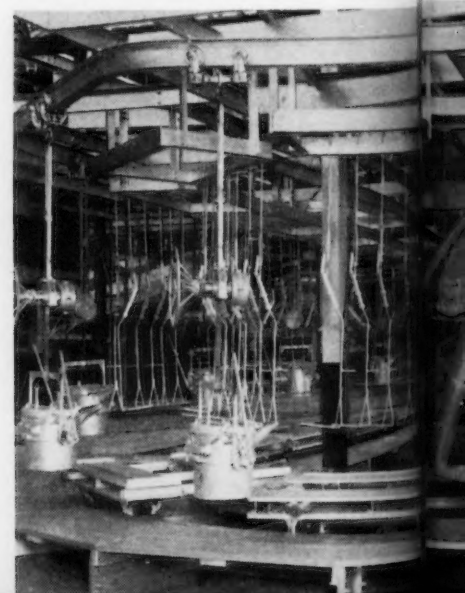


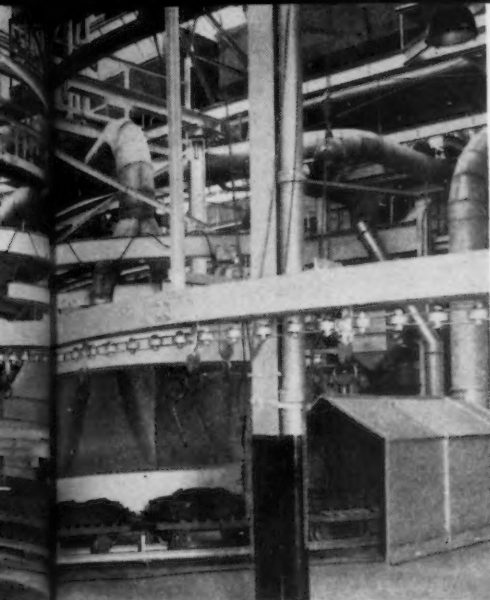
**FIG. 8**—After the cope has been removed through a series of cooling tunnels, the castings are shown in this photograph. The castings are hours on slowly moving conveyors to bring the pushes drags onto shakeout platform. Note

## ENGINE FOUNDING MODERN M

**A** HIGH level of mechanized production of castings is achieved in the new Indianapolis foundry of International Harvester Co. This foundry, a part of the company's new \$7,000,000 motor truck plant in that city, produces all the castings used in International trucks. One of the outstanding features of this foundry is the high degree of dust

**FIG. 4**—This Osborne unit equipped with 20 to produce small castings in snap flasks. The around the oval takes place at fixed



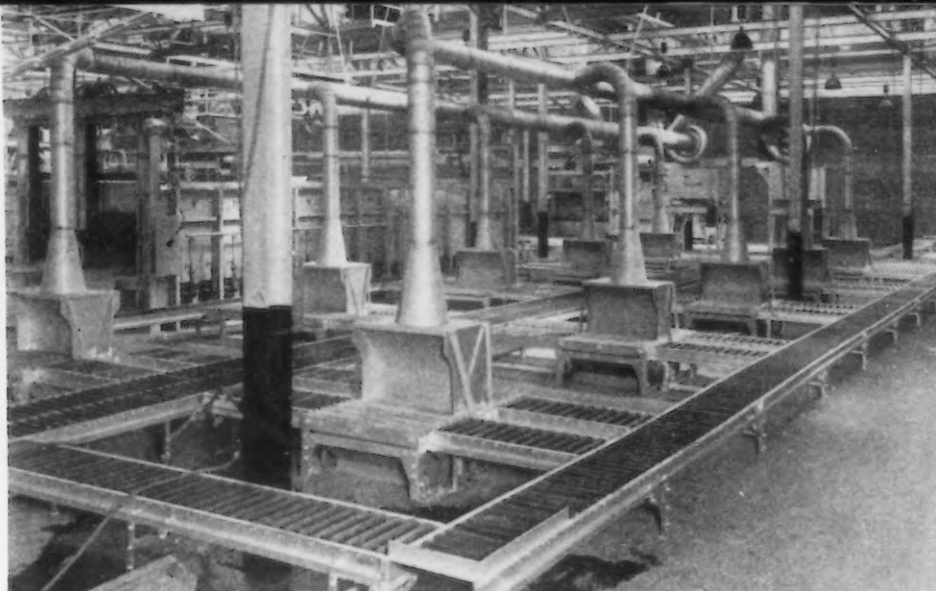
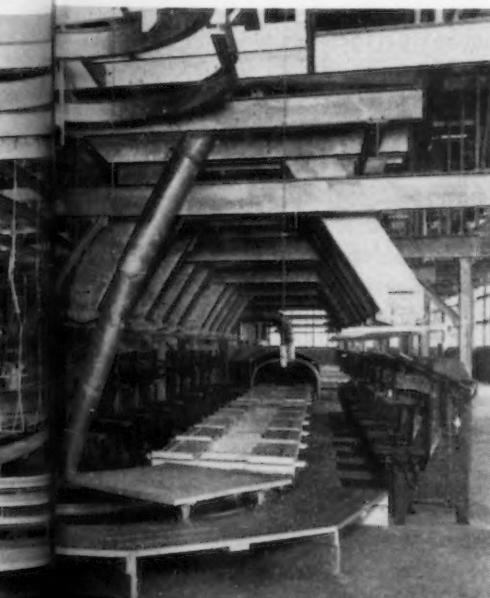


moved on  
nels, the  
s are h  
bring the  
platform  
the drags containing the castings have passed  
castings are lifted from the drag at the point  
on an overhead conveyor and spend about three  
down to a handling heat. Air cylinder at left  
Note the number of exhaust hoods.

## UNING IN THE RN MANNER

elimination which has been realized.  
Some of the more important char-  
acteristics of the plant are: Melting  
equipment, four No. 12 Whiting  
cupolas with an hourly capacity of  
20 tons each; floor area, 215,795  
sq. ft.; total length of conveyors,  
16,583 ft.; capacity of sand storage  
bins, 22,820 tons.

with 20  
asks. The  
e at first  
Champion jolt-squeeze molding machines is used  
unit is of the index type in which movement  
intervals rather than continuously.



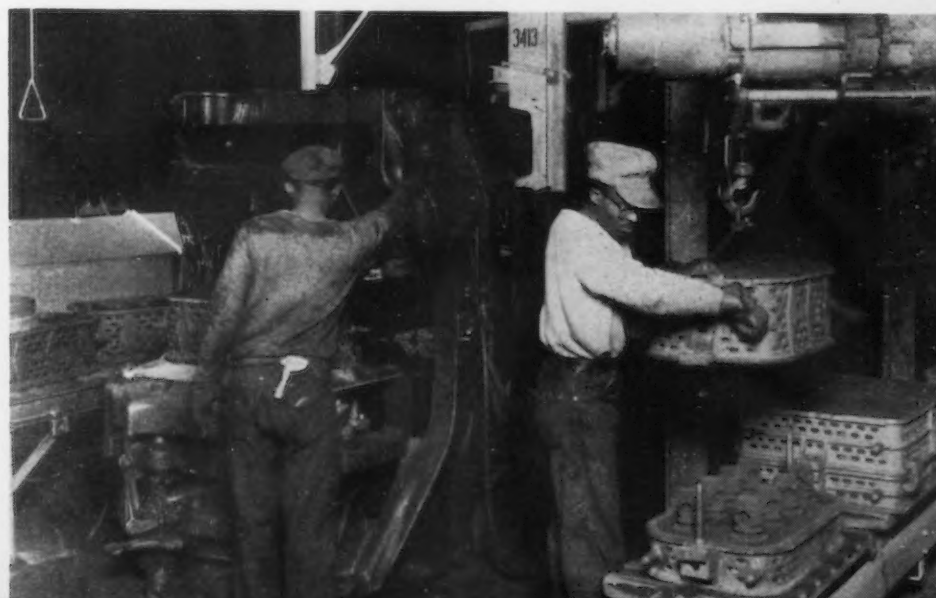
**FIG. 7**—The chipping room, shown above, is designed to keep casting handling costs at a minimum. Each of the 10 chipping booths is individually exhausted through an American Air Filter Rotoclone precipitator. A Hagen annealing furnace can be seen in the background.



**FIG. 6**—The cupolas are tapped continuously into five-ton reservoir ladles. From these ladles the iron moves to molding floors in covered and insulated hot metal carriers such as shown in this illustration. The iron is then transferred to small ladles for pouring into the molds.

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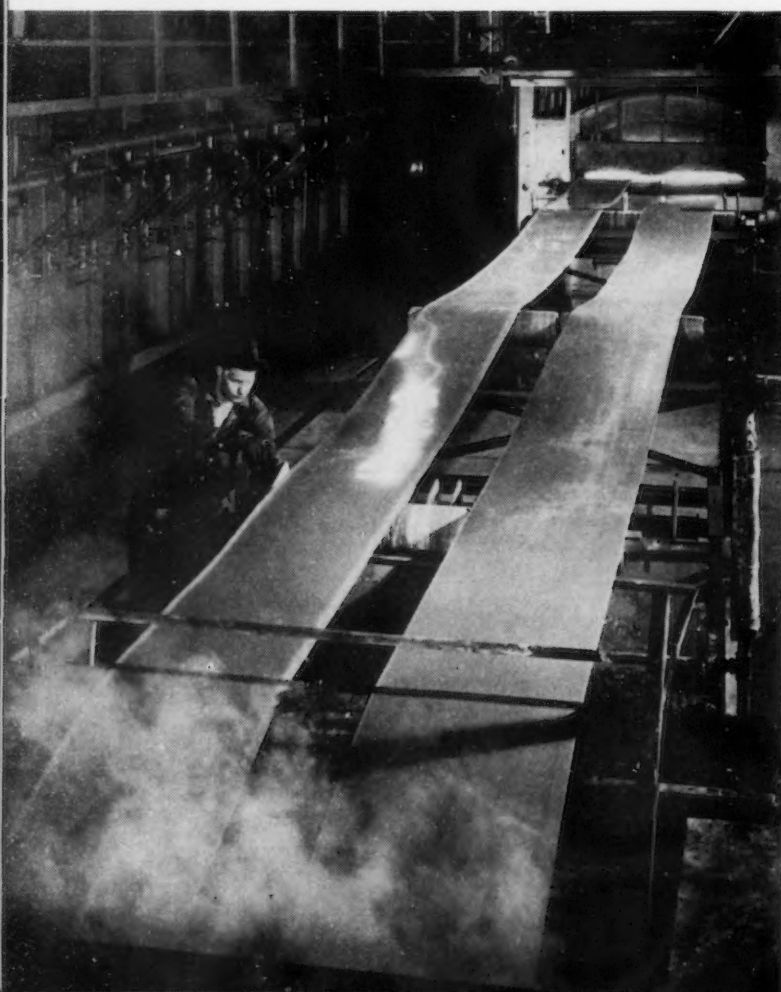
**FIG. 5**—Intermediate-size castings, such as these engine pistons, are rammed up on Milwaukee Foundry Equipment jolt-squeeze machines. Sand is fed from the bin gate seen at top of photograph. Sandslingers are employed in making larger castings.







**S**HEETS are individually inter-packed with wrapping paper and shipped in wood cases.



**W**IDE stainless strip passing from the normalizing furnaces into a continuous pickling unit. . . .

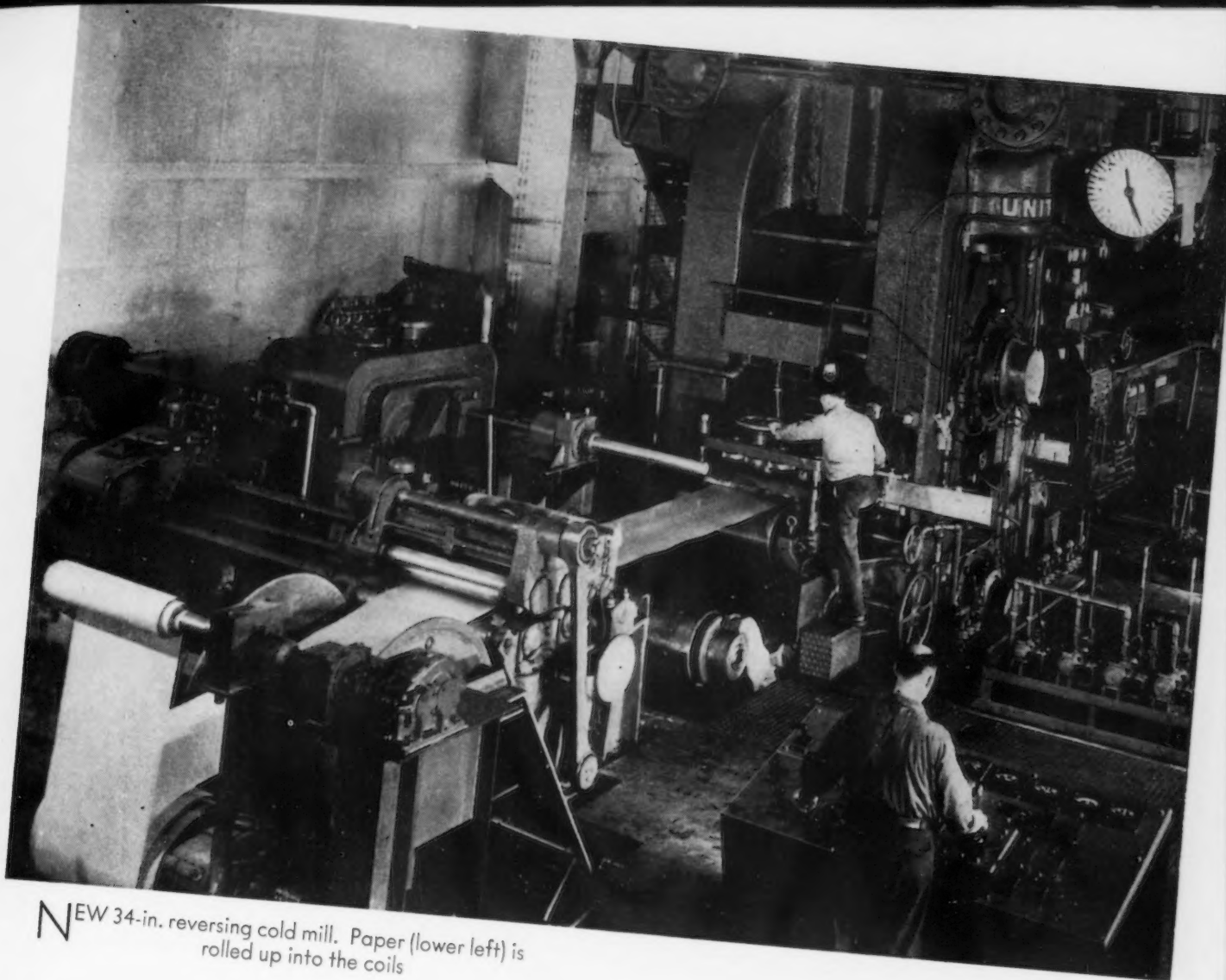
## Republic Expands

**K**EEPING pace with a rapidly increasing demand for stainless steel, the Republic Steel Corp. this week formally put into operation improved and greatly expanded stainless steel facilities at Canton and Massillon, Ohio. The stainless department now occupies all wings of a 5-acre building.

On Tuesday a large group of newspaper and trade paper editors inspected the new finishing plant as well as a 25-ton electric furnace transferred from Buffalo and a completely new 50-ton unit which was recently added to the company's battery of six electric furnaces at Canton, where the stainless steel is produced.

With the exception of the hot rolling of coils, which is done at nearby Warren, Ohio, Republic has now concentrated all its stainless steel operations in the company's plants at Canton and Massillon. The im-





NEW 34-in. reversing cold mill. Paper (lower left) is rolled up into the coils

SLITTING stainless steel coils into narrow strip.

## Stainless Facilities

proved and expanded facilities give Republic a stainless capacity in the strip department alone of 1200 tons per month.

With the new facilities, Republic will be able to produce coils of cold rolled stainless strip as narrow as  $\frac{1}{4}$  in. and as wide as  $23 \frac{15}{16}$  in. Polishing, which used to be done by the inch, is now done by the foot, the Massillon plant being equipped to polish a sheet 68 in. wide by 24 ft. long.

Part of the 5-acre building had to be rebuilt to accommodate new equipment. Included here are three annealing and pickling lines, which were moved from Republic's plant at Warren, and three new 4-high reversing mills, the largest of which is a 34-in. unit, and a new 2-high skin-pass mill.



# GRINDING CRACKS IN

OWING to the extreme hardness of quenched steels they are usually worked by grinding, which sometimes causes numerous hair cracks, usually called "grinding cracks."

The essence of various investigations attempts to explain this fact as follows: (a) It is assumed that previously existing quenching cracks simply make their appearance on the surface during grinding; (b) the quenched steel is very brittle and is under a severe stress because of quenching, and because of the mechanical shock of grinding it cracks very easily; (c) the partial heating of samples by grinding is taken as the main cause without giving any further explanation.

For the prevention of the cracks, there is usually proposed a selection of proper grinding wheels and their operation under correct conditions. Also, G. R. Brophy has suggested (A.S.S.T., 1930) that such cracking can be avoided by tempering steels before grinding to a hardness of about  $R_c 60$ .

So far many investigations regarding this problem have been reported, but still the exact cause of this type of crack and the methods of its prevention are rather obscure. Recently, the problem has been studied for quenched carbon steels by Kaizo Monma and the data secured were presented in the last report of the Tôhoku Imperial University.

Rectangular specimens of 0.9 per cent carbon Swedish steel were made, the dimensions being 5x30x50 mm. with a 5x10x10-mm. projection for the holder during quenching. All specimens were annealed at 850 deg. C. for 30 min. and slowly cooled in a vacuum furnace.

The specimens were quenched from 810 deg. C. (series A in the accompanying illustration) and 795 deg. C. (series B) in water after being held at those temperatures for 10 min. in vacuum. The quenched specimens were tempered for 30 min. at different temperatures in an oil bath and cooled slowly in it. They then were subjected to a grinding test, one-

half the area of a surface being carefully ground off to a 0.5-mm. depth. After grinding, the specimens were heated very slowly to about 800 deg. C. in a vacuum and cooled slowly, and then the other half of the same surface was ground as before. The portion of the surface which was ground after annealing showed only quenching cracks and no grinding cracks. Hence, by comparing the two portions of the ground surface, it was observed how grinding cracks were induced in a quenched specimen. The specimens were polished as if for microscopic examination, etched with 5 per cent  $HNO_3$  solution, and then photographed.

In the accompanying illustration, (a) shows the condition of the surface, its upper half area ground off, and (b) the specimen ground after quenching from 810 deg. (upper portion) and after annealing (lower portion). Note that there are numerous hair cracks in the upper portion, but none in the lower. Therefore, it is considered certain that the hair cracks occurred during the grinding operation.

Specimens (c), (d), (e), (f) and (g) were quenched from 810 deg., tempered at different temperatures between 100 deg. and 150 deg., and treated as before. In these specimens tempered at temperatures lower than 133 deg., many grinding cracks are noticeable, but on the contrary in the specimens tempered at temperatures higher than 141 deg. there are no cracks.

Specimens (h), (i), (j), and (k) were quenched from 790 deg.; (h) was ground in the as-quenched condition, and the others after tempering at 100 deg. to 150 deg. Agreeing with the former data, these results also show that grinding cracks disappear completely when the tempering is done at temperatures exceeding a certain critical temperature between 125 deg. and 150 deg. C. (257 deg. and 302 deg. F.)

An experiment was then carried out to compare the ordinary dry grinding with the wet grinding with regard to grinding crack prevention. Specimens (l) and (m) are those quenched

from 795 deg. and 810 deg. respectively; the left half of their surfaces was ground dry, as in the former cases, and the right half was similarly ground, but with sufficient cooling water. From these specimens and also from many others, it has been concluded that the difference between the dry and wet methods of grinding is small as regards the grinding cracks that result.

In these experiments it was observed that by grinding a quenched carbon steel, there occur many grinding cracks even though the operation is made very carefully. However, when the specimens are tempered at temperatures higher than about 150 deg. C. (302 deg. F.), no such cracks are observed. How can these facts be explained?

When a quenched steel is tempered at about 150 deg. C., the hardness does not decrease in a marked degree. Hence, factors such as over-heating of the surface during grinding, and the internal stress and the brittleness of a quenched specimen (which are generally taken as the cause of grinding cracks) do not seem to be reduced much by such weak tempering. The quenched steel, however, undergoes an  $\alpha \rightarrow \beta$ -martensite transformation in the 120 deg. to 170 deg. tempering range, accompanying a marked volume shrinkage.

When grinding goes on, though it is made very carefully, as in the case of these present experiments, the surface being ground is heated to a temperature high enough to transform  $\alpha$  into  $\beta$ -martensite. Inasmuch as the grinding heat is small in quantity, the inner portion of the steel remains in the  $\alpha$  state, as may be proved by microscopic examination. Therefore, the  $\alpha$ -martensite core of larger specific volume is now covered by a thin layer of  $\beta$ -martensite, the latter being held in severe tension by the core. The  $\beta$ -martensite has low susceptibility for plastic deformation, and therefore, when it is unable to withstand this tension, cracks are formed in the covering layer, just in the same way as cracks are produced in a quickly dried

# QUENCHED STEELS ♦ ♦ ♦

clay brick. When tempered at above 150 deg. nearly the whole specimen is transformed to  $\beta$ -martensite, and so by grinding no tension and consequently no cracks result.

In order to obtain further proof of this view, an additional experiment was carried out. A specimen quenched from 795 deg. was polished with fine emery paper wetted with petroleum, so that no heat was generated by polishing. This specimen was then placed horizontally in running water about 1 mm. deep. The surface was then heated instantly with a small oxyacetylene flame, by pushing the water layer away with the flame. By such treatment only a very thin layer of the specimen surface was tempered, the result being that cracks appeared here and there.

Specimens (n) and (o) were obtained as just described. They were etched with a solution of 5 per cent  $\text{HNO}_3$ , and the black spots seen on the surfaces show the portions overtempered by the flame; the structure of these spots was martensite-troostite, while the remaining portion was  $\beta$ -martensite. In this experiment the cracks were only produced by the tempering treatment and with no mechanical shocks. This result seems to prove the correctness of the explanation for the cause of cracking.

It is to be noted that, in the experiment just described, if the dry polishing is adopted originally, the abrasive heat will temper the specimen, and hence no cracks are produced during the heating operation.

Similar grinding cracks are said to be observed in the case of special steels such as high speed steel. Such steels were examined but the cracks in question did not appear at all. Hence, the crack seen in such high speed steels seems to come from quite different causes.

All the data secured in this investigation may be summarized as follows:

(1) The grinding crack in quenched carbon steels is caused by the shrinkage of the thin surface layer of the

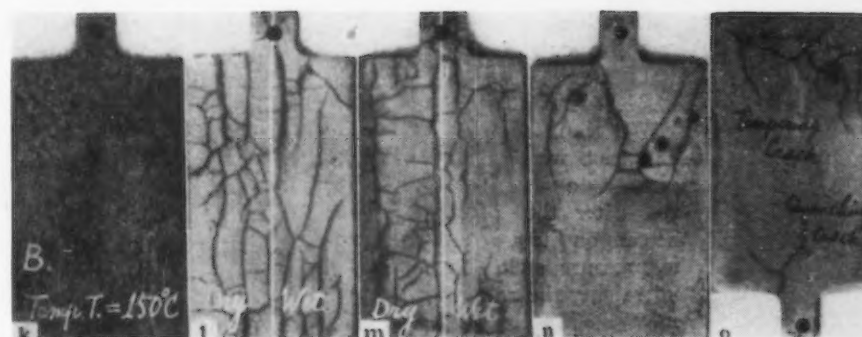
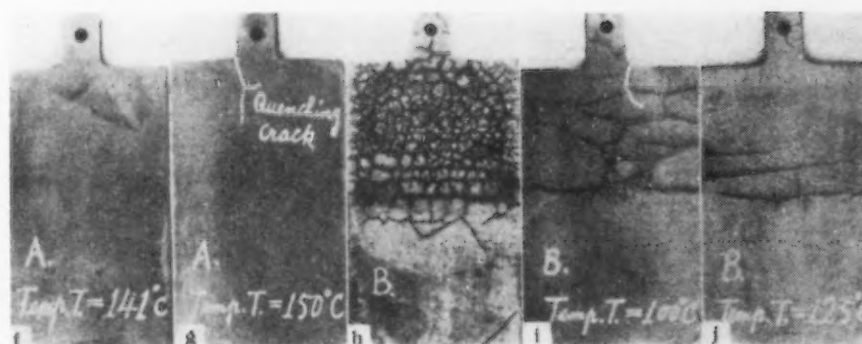
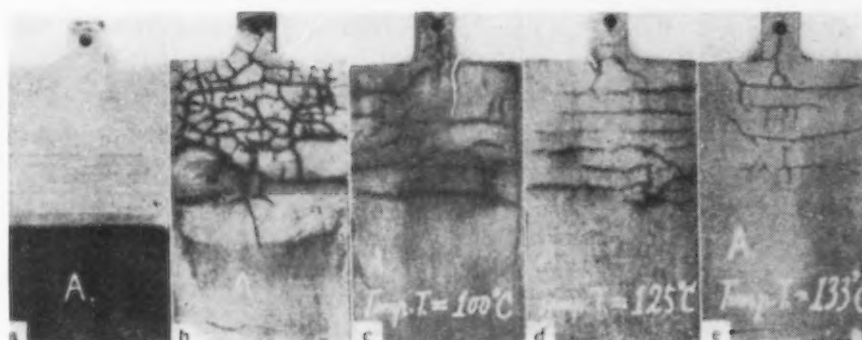
specimen, due to the  $\alpha \rightarrow \beta$ -martensite transformation caused by the heat of grinding.

(2) Hence, simply by a light tempering of the quenched specimen on its surface, similar cracks may be produced.

(3) In order to avoid the occurrence of the grinding cracks, quenched specimens should be tempered at above

150 deg. C. (302 deg. F.), so that there will obtain a  $\beta$ -martensite structure before grinding; proper operation and proper selection of grinding wheels are also essential.

Both the wet and the dry grinding methods result in only a small difference in number of grinding cracks, and hence the use of cooling water is of little advantage.



**S**TEELS (0.9 per cent carbon) quenched in water from 810 deg. (A) and 795 deg. C. (B).



# WHAT'S NEW IN WELDING

**F**ULLY automatic spot welding of small sheet steel assemblies on a conveyor is now being performed in the automotive industry. Further advances have been made in resistance welding controls, one new timer permitting welding of stainless steel with conventional equipment. New sizes of arc welders have been put on the market in recent months, and new designs of welding and cutting torches

are announced. For low temperature work, new types of electric and gas heated soldering iron have been developed, and low temperature rods for oxy-acetylene welding have been introduced. Other pieces of welding apparatus recently brought out include a power-driven gas cutting machine, welding positioner and a welding helmet.

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**A**DAPTATION of a standard spot weld timer to a special seam welder with power driven loop conveyor has made possible the continuous automatic spot welding of automobile component assemblies. Designed and built by the *Expert Welding Machine Co.*, Detroit, the machine is able not only to make accurately spaced spots, but also to modify the size or length of spots, irrespective of the conveyor rate, through the adjustable timer control. This unit has been built specifically to weld 19-gage oil baffle plates to 18-gage valve cover plates of two different sizes.

The motor driven conveyor carries 10 short-circuiting dies on which are placed either 18- or 12-in. valve cover plates (for eight- and six-cylinder engines respectively). The baffle plate is placed on top of the cover plate and the two are held in the desired position by means of a stud with a bayonet fitting. As the conveyor carries a loaded die under the rolls, a cam on the die trips an air valve, admitting air into the pressure cylinders and bringing the rolls into contact with the work. A limit switch automatically starts the timer, and after the last spot is completed, the cam on the moving die releases the pressure switch, cutting the timer and raising the rolls from the work.

The timer, a Model No. 80 built by *Weltronic Corp.*, 2832 E. Grand Boulevard, Detroit, carries dial controls for

setting "current on" and "current off" time—both adjustable in 1-cycle steps to from 1 to 30 cycles of current. Interruptions repeat automatically as long as the pilot switch controlled by the cam on the moving die is in the "on" position.

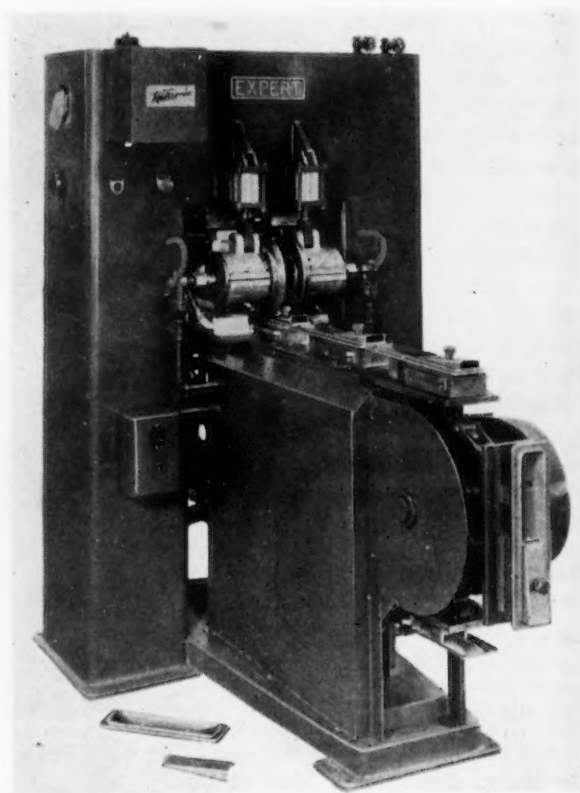
o o o

**C**ONTINUOUS automatic spot welding of automotive assemblies is being performed on this conveyor type machine with the aid of a *Weltronic* interrupting weld timer and seam welding rolls.

o o o

Although designed for a production speed of 450 pieces per hour, the machine is readily adjustable to suit any speed needed in relation to flow of parts in production. Change in conveyor speed is quickly compensated for by changing the dial setting on the timer. Other advantages of the set-up are: smaller machine and transformer permissible (50 kva.), elimination of necessity of externally water cooling the work (rolls are internally water cooled), decreased current consumption, etc. The transformer is of low impedance design, close coupled in the inductive loop.

**W**ELTRONIC CORP. has also announced two new types of welding timers. One, known as the dual timer for controlling the welding of two different materials, accurately controls two spot welding guns at the same time through a single transform-



# APPARATUS

By FRANK J. OLIVER  
Associate Editor, *The Iron Age*

er and a single timer, permitting four separate welding operations without changing the timer setting. This range is effected by providing two separate time control dials for each gun, the



TWO new 50-kw. machines have been added to the line of Ace spot welders made by the Pier Equipment Co., Benton Harbor, Mich. The one illustrated is motor driven and is automatically operated; the other is manually operated by means of a new swivel jointed foot treadle. Both may be used for spot or projection welding, and with suitable fixtures for butt welding. Among the refinements found in these models are recessed automatic trip control and timing adjustment, eight point heat regulating switch and a longer life, 300-amp. contactor. Four throat depths are available and lower horn may be adjusted to provide spacing up to 15 in. Transformers are designed to operate on 220-volt, 60-cycle supply.

• • •

selection between dial settings being made by the operator at the gun by means of push buttons. Known as model 58-B, this electronic tube timer is constructed for operation at 110, 220 and 440 volts, and has a frequency



TWO-MAN, bus type welding fixture for making spot welds in semi-inaccessible locations such as the automobile reveal and garnish molding shown. The inclosed transformer is short coupled to bus bars which also serve as nesting dies for the work, and a single hydraulically operated spot welding gun of the short-circuiting type is used alternately by the two operators, one of whom is unloading and loading a fixture. To permit its admission in the concave side of the garnish molding, the tip of the upper electrode is made relatively thin but the rest of the electrode is heavy to keep it cool and prolong its life. This fixture, which was built by Progressive Welder Co., 705 Piquette Avenue, Detroit, has more than tripled production speed over previous methods.

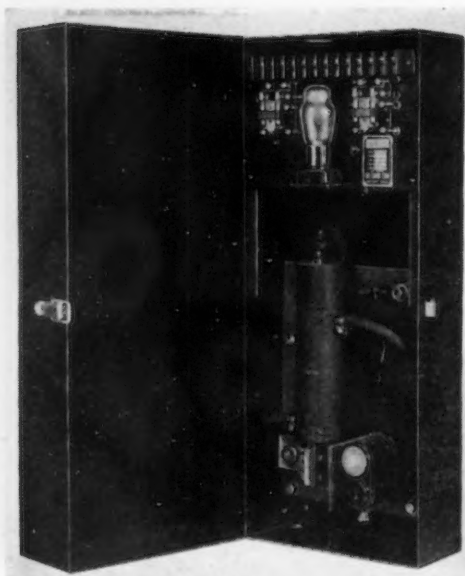
range of 1 to 30 cycles in even one-cycle steps. The timer is panel mounted and is inclosed in a swing cover case.

The other new type is a split-cycle timer for use in welding thin section stainless steel, brass screen, copper lugs, aluminum and for similar applications where unusually high heat is required in a very short cycle. This model 90-1 timer may be adapted to virtually any standard resistance welding machine. It provides a full half cycle, and the relays are so designed that they close on the minus half cycle, permitting the timer to fire on the positive half cycle. The timer is available in 220 and 550 volts, with frequencies of 25, 50 and 60 cycles, and amperage range of 150 to 600. Besides the two

relays, it has one electronic tube and one rectifier tube.

## Weld Recorder

WITH the increased use of welding and the increased rigidity of specifications, sound, dependable welds are a primary requirement. Spot welding is now being used extensively on structural members of aircraft, rail cars, automobiles, buses, trucks, and trailers. Each of these structures is subjected to vibrational stresses of considerable magnitude, and in some of them certain parts must be airtight and gastight. Here, the failure of a single weld might be fatal. Because the numerous variables affecting the quality of spot welds are not under con-



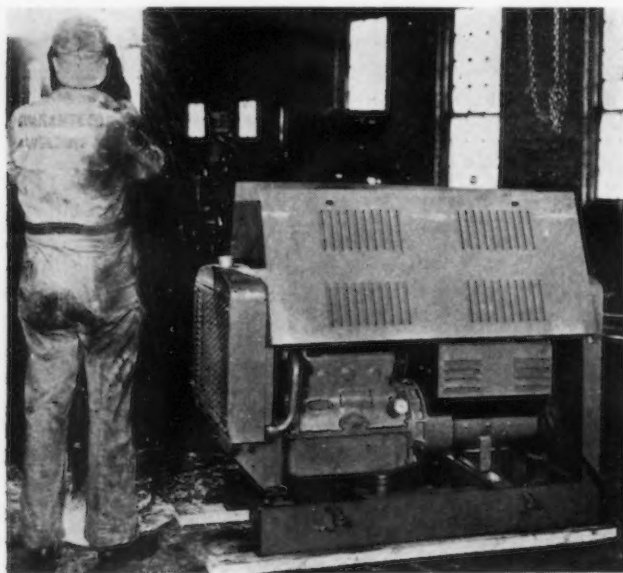
**W**ELDTRONIC's new low cost, half-cycle timer, designed for use with any resistance welding machine, will facilitate the welding of stainless steel, brass, copper and aluminum by providing a large amount of heat in a brief interval.

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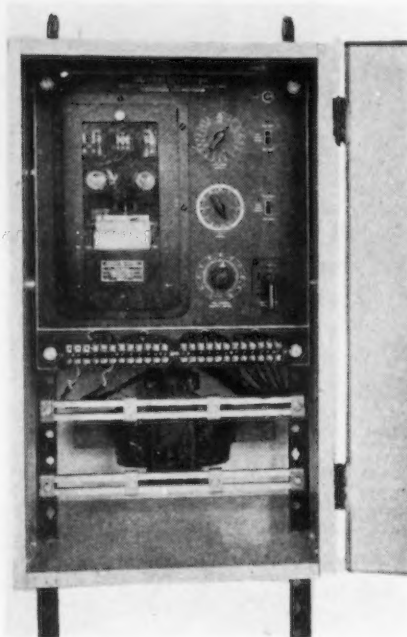
stant control, *General Electric Co.* has developed a weld recorder to record and indicate these variations. This control station, illustrated, acts as a recording instrument, signaling device, and lockout control which measures the electrical input to the spot-welding machine for each spot weld.

#### Engine Driven Arc Welder

**A** NEW 200-amp. engine driven arc welder which is exceptional in light weight, small size and low cost



for a unit of its size is announced by the *Lincoln Electric Co.*, Cleveland. This SAE-200 J is of the Junior type and is built to meet requirements for a wide range of d.c. arc welding. It can be used to weld light gage metal by metallic arc or galvanized sheets by the carbon arc, or can be used in welding cast iron, to fabricate a wide variety of equipment and to do hard facing. It is said to produce uniform current



**G-E** WELD recorder for use in conjunction with a thyatron spot welding control panel is so designed that when the electrical input to the welder ( $I^2t$ ) varies sufficiently to cause a defective weld, a bell gives a continuous audible signal and the weld initiating circuit is automatically opened, preventing subsequent welding until a push button is pressed. In addition, the recorder chart indicates visually that the weld was not within the preset allowable limits and shows whether the heat was above or below normal. The Edward G. Budd Mfg. Co., Philadelphia, is using 40 of these General Electric weld recorders in the "shot welding" of stainless steel airplane fuselages and rail car structures.

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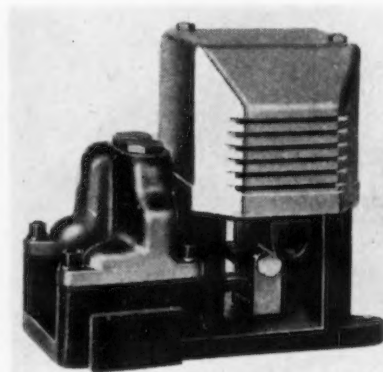
**W**EIGHING under 900 lb. and only 56 in. long, this Lincoln SAE-200 J engine driven welder of 200-amp. capacity is light enough to be wheeled by one man or lifted by a  $1/2$ -ton chain or crane falls.

for speedy welding with either bare or shielded arc type electrodes.

The generator is a single-operator, variable voltage type with laminated pole pieces, increasing arc stability and simplifying welding. Current range, welding duty, is 40 to 250 amp. Dual continuous control enables independent adjustment of both open circuit voltage and welding current. Coils in the armature are wound with glass insulated wire and are held in mica lined slots, and the leads are connected to the commutator by high melting point solder. The generator frame is mounted directly to the engine bellhousing and drive connection is by flexible coupling. The gasoline engine is a four-cylinder type, delivering 26 hp. at 1800 r.p.m. Base is made of heavy steel channel, strongly braced. Provision is made whereby the entire unit can easily be raised with one hook or chain fall.

#### Shape Cutting Machine

**S**TEPLESS cutting speeds ranging from 4 to 40 in. per min. can be obtained without varying the speed of the motor in the model C Flame-Shaper recently introduced by the *Schrader-Bowers Co.*, 2629 Lincoln Way West, Mishawaka, Ind. The unit is suitable for cutting steel plate up to 8 in. thick. The new variable speed control system used in this torch cutting machine is a mechanical device consisting of a simple compensating transmission interposed between the motor and a centrifugal governor, allowing the motor to run at constant speed. Transmission is controlled by a dial calibrated in inches per min. The unit is driven along a track section 6



**S**OLENOID operated air valve developed by the Ross Operating Valve Co., Detroit, for high speed operation of welding guns. Although it is claimed that this model 192, special Ross valve has operated at considerably higher speeds on experimental work, it is now regularly delivering 400 welds a minute on production jobs, representing a new record for this type of work.



ft. long, and an automatic free-wheeling device allows it to be pulled into any position on the track without releasing the clutch.

Lateral movement of the torch is controlled by a manually operated cross carriage through a worm and wheel drive of 8:1 ratio. The hand-wheel for controlling this carriage is in a convenient position for operating even when the machine is moving ahead. This lateral carriage is mounted on the post in such a manner as to permit a cut at any angle, and the torch holder is adjustable so that it may be placed either in front or at the sides of the machine. A convenient tracer guide is furnished for following drawings or templates, and a radius rod and center point is included for circle cutting.

**L**IGHTEST to heaviest gage material can be arc welded with this size 3W transformer type arc welder of 500 amp. continuous capacity which has recently been added to the line of the Owen-Dyneto Division of the USL Battery Corp., Syracuse, N. Y. It can be connected to either a 220 or 440 volt line, and can be worked by two operators simultaneously drawing from 30 to 280 amp. or by one operator drawing up to 560 maximum. This flexibility is obtained by shifting a copper bar on top of the machine. Electrodes from 1/10 to 1/2 in. diameter can be used with this welder, which weighs 460 lb.



**A** SERIES of oxy-acetylene gouging nozzles, for use with a standard hand-cutting blowpipe, has been announced by the Linde Air Products Co. These new Oxweld nozzles, which are available in three sizes, are so designed as to deliver a relatively large jet of oxygen at low velocity. By proper manipulation of the blowpipe, a smooth, accurately-defined groove can be cut or gouged out of the surface of the metal. By using various standard size nozzles and manipulations, the groove can be varied in width and depth. Uses for these nozzles include: gouging the underside of electric welds; removal of weld metal; preparation of plate edges for welding; and maintenance and scrapping operations.

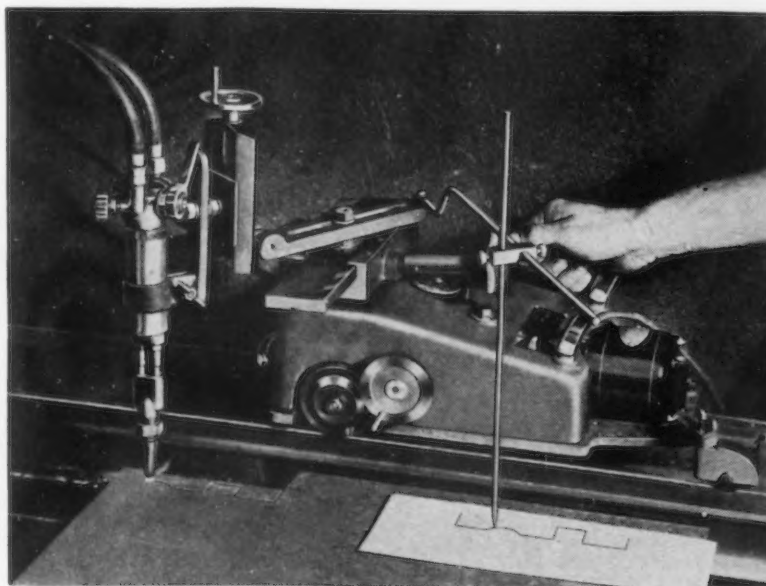


**O**XWELD type W-29 welding blowpipe, announced by the Linde Air Products Co., is especially designed for welding in light production work and in aircraft construction. Both valves are located at the forward end of the handle where they may be readily adjusted by thumb and forefinger. The pencil point welding flame is concentrated, yet is soft enough for good control of the welding puddle. Valves are the packless type and are shielded against knocks. Small size screw type hose connections are used on the blowpipe handle, allowing the use of 3/16 in. hose for full blowpipe capacity. The unit weighs only 15 oz., but is strongly constructed.

### Cutting and Welding Torches

**T**HE Linde Air Products Co., a division of Union Carbide & Carbon Corp. has brought out a number of new designs in welding and cutting torches in recent months. Three special Oxweld special nozzles have been introduced for performing gouging operations in connection with a medium pressure cutting blowpipe. Another product also illustrated, is the type W-29 welding blowpipe for light work in metals up to 3/8 in. thick.

Under its Prest-O-Weld brand, Linde has introduced three new blowpipes. One, illustrated, is the new C-108 cutting blowpipe. It has similar features to the W-108 welding blowpipe, not illustrated, which has individual mixers in each head, making flame adjustment easy and giving definite resistance to flashback. The welding heads provide a long slender flame with a well formed inner cone that permits thorough heating of even the bottom of the V and provides good control of the welding puddle. On the

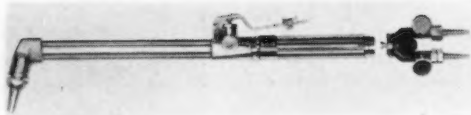


**M**ODEL C Flame-Shaper, made by the Schrader-Bowers Co., has a number of design innovations that increase the versatility of the machine.

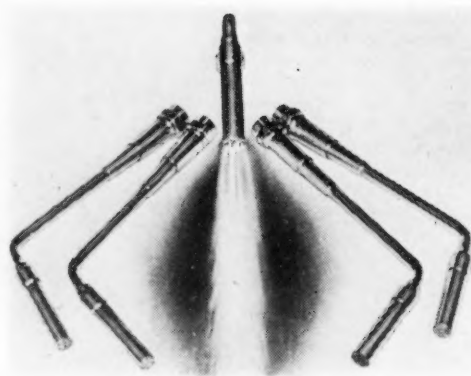
cutting torch a lower preheat oxygen pressure is used, permitting a large flame for cutting very dirty or heavily

scaled material. A type CW-108 cutting attachment is also offered, since both the cutting and the welding torch

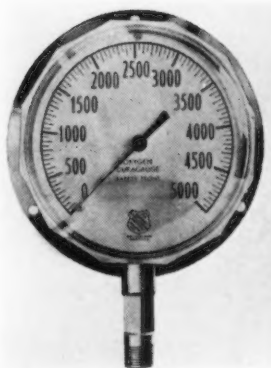
**D**ETACHABLE valve body construction is continued in the new line of Prest-O-Weld welding and cutting equipment made by the Linde Air Products Co. The type C-108 cutting blowpipe is shown.



**R**EGO GXH series multiple tips for hard surfacing of metals are made in four sizes. The multiple tip construction permits high heat output, yet produces a soft, brush like flame which eliminates turbulence in the weld puddle and the tendency to form pin holes after the deposited metal has cooled. The wide flame produced also makes it easier to keep the weld zone and the rod in a protective carbonizing flame envelope. An individual mixer is provided in each tip. These tips are designed for use with standard Rego GX or SX welding torch handles made by the Bastian-Blessing Co., 242 E. Ontario Street, Chicago.



**B**OURDON tube of this new Ashcroft Duragage for high pressure oxygen service is made of beryllium copper and the socket is of forged bronze for safety sake. Case is a heavy brass casting and the cover is transparent plastic of a shape that opens up the dial for easy reading. Made by the Ashcroft American Gauge Division of Manning, Maxwell & Moore, Inc., Bridgeport, Conn.



**A** NEW model welding positioner with capacity of 6000 lb. on which table tilt and table rotation are independently power operated has been developed by Cullen-Friestedt Co., Chicago. Gears for rotating and tilting the table are self-locking in all positions. Rotation is through a full circle, while tilt is through an arc of 135 deg. from horizontal. Capacity is based on the center of gravity of a load 12 in. from the table face and 6 in. to the side of the rotating axis. On machines with standard bases, table height is adjustable from 42 to 54 in. With the exception of that part of the work which is in contact with the table, all surfaces may be maneuvered for positioned welds. The positioner's mechanism is so placed that regardless of the table position, there will be no interference.



retain the Prest-O-Weld detachable valve body construction.

A new *Rego* multiple tip head for hard surfacing work is also illustrated. These tips are designed to produce the deposit of surface metal free of soft spots and pinholes, even with inexperienced operators.

#### Hard Facing Rod

**H**AYNES 93 hard-facing rod, a new alloy welding rod for hard-surfacing wearing parts, has been announced by *Haynes Stellite Co.*, Kokomo, Ind., another unit of Union Carbide & Carbon Corp. It is recommended for use where severe abrasion, accompanied by only a moderate amount of impact, is encountered, such as on dredge pump impellers and cement clinker and cinder crusher rolls. The new alloy rod does not possess as high wear resistance as Haystellite cast tungsten carbide products or Haynes Stellite alloys. It is, on the other hand, more wear-resistant but not as tough as Hascrome hard-facing alloy.

Haynes 93 alloy rod is of a ferrous composition and contains chromium, molybdenum, cobalt, and other alloying elements to the extent of more than 40 per cent. It has a tensile strength of about 43,000 lb. per sq. in. and hardness, as deposited by oxy-acetylene welding, of 62 Rockwell C. When deposits are heat treated by heating to 1950 deg. F. and then air-cooling, the hardness reaches 66 to 67 Rockwell C. It can be applied by either the oxy-acetylene or the metallic arc process.

#### Welding Electrodes

**M**UREX type FHP is a newly developed electrode put out by the *Metal & Thermit Corp.*, 120 Broadway, New York, for deep groove welding, fillet welding where the work is positioned, and other downhand work. It is said to have a high rate of deposit and operates with a steady, smooth-flowing arc which is easy to control. Physical properties of the deposited weld metal are well above the requirements for Class I and Class II pressure vessels under the A.S.M.E. boiler code and conform to A.W.S. specifications for grade 10 filler metal. Little spatter is produced and the slag formed removes freely. This electrode is made in sizes from  $\frac{1}{8}$  to  $\frac{1}{4}$  in. On positioned fillets, current up to 400 amp. may be used on the  $\frac{1}{4}$ -in. size.

**S**TAINWELD D is the designation of a new stainless steel electrode announced by the *Lincoln Electric Co.*, Cleveland, for the arc welding of stain-

less steel of the 25 per cent chromium, 20 per cent nickel type, such as American Iron & Steel Institute specification No. 310. This electrode may also be used for welding various stainless steels to mild steel and for welding of steels that are air hardening and cannot be heat treated after welding, such as armor plate. Positive polarity is used on the electrodes and only sufficient current to obtain a free-flowing arc and proper fusion to base metal. Specifically, this range is between 140 and 225 amp. for the 1/4-in. electrode. Stainweld D is made in five diameters ranging up from 3/32 to 1/4 in. by 32nds.

#### Low Temperature Welding Rod

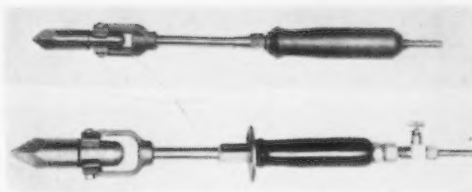
**W**ELDING of a wide variety of metals can be performed by the oxy-acetylene process at unusually low temperatures with a new type of welding material known as Castolin, supplied in rod form and in powder or paste fluxes. In repair work, the low temperature at which binding occurs makes it unnecessary to preheat the work, saving in both time and money; and many welding jobs heretofore almost impossible to perform are accomplished without difficulty, it is claimed by the *Park Sales Co.*, 3 Park Place, New York, who is marketing this product. Alloys for steel aluminum, brass and bronze welding are available.

Castolin 190 for welding aluminum and its alloys, even in the form of very thin sheets, flows at 930 deg. F and has a tensile strength of 35,000 lb. per sq. in. Castolin 185, also called Bronzochrome, flows at 750 deg. and is for building up on steel, cast iron, copper, brass and bronze. It is said to be poreless as deposited and though it has a hardness of 230 Brinnel, it can be readily machined. Hence it is suitable for repairing machinery and for building up worn parts. Castolin 14 is for cast iron. It binds at 900 deg. and has a tensile strength of 47,000 to 51,000 lb. per sq. in. No. 16, particularly recommended by the supplier for thin gage steel, has a tensile strength of 115,000 lb. and binds at 1470 deg. No. 18 is for copper, brass and extruded bronze; it binds at 1600 deg. and has a tensile strength of 65,000 lb. Other Castolin rods are made for cast aluminum, die castings and for cast iron. Further details are given in bulletin C-13.

#### Temperature Indicating Pellets

**P**REHEATING operations prior to welding can be accurately controlled through the use of temperature indicating pellets, known as Tempils.

**S**MALL and standard size Prest-O-Lite soldering irons recently introduced by the Linde Air Products Co. Utilizing acetylene for fuel, the flame cone is in close proximity to the spherical end of the copper tip, and the secondary flame contacts and envelops this end of the tip. In the standard size, the air-acetylene mixture is carried to the tip by means of a separate tube so as to keep the gas mixture cool. The coppers are said to be kept at a constant temperature due to the stability of the flame. Tips are held by Everdur bolts. Handles are of bakelite.



**N**EW electric soldering irons fitted with plug tips held into the heating head of the iron by a screw have been introduced by Stanley Tools, New Britain, Conn. These tips are available in two types: copper and armor clad, the latter having a special coating to reduce wear and corrosion and to prolong tip life. These soldering irons are made in four sizes, ranging from 105 watts and 3/8 in. tip diameter to 350 watts and 7/8 in. tip. The heating units are hermetically sealed to prevent corrosion and are wound around a hollow core. Handles are of hardwood.



**T**HE heating element is housed in a dent-proof barrel made of solid hexagon steel in this new line of electric soldering irons offered by the Hexacon Electric Appliance Corp., 161 Clay Avenue, Roselle Park, N. J. Due to its shape, the iron can be held in a vise when replacing the tip, without danger of denting the outer housing and injuring the heating element, which is formed of nickel chromium resistance wire, with mica insulation. These irons are designed for hard service and are made in three capacities from 60 to 170 watts and 1/2 to 1 in. tip diameters respectively.



Useful also for other industrial heating applications, particularly in the black heat range below 1000 deg. F., these pellets have a sharp and rapid melting action and are accurate within 3 per cent of the stated temperature. In application, the pellets are merely placed upon or against the heated object and the point of liquefaction noted. Tempils are available in whole hun-

dred degree ranges of 200, 300, 400, etc., deg. F. Each pellet is stamped with the temperature at which it melts and in addition, each temperature range is made in a distinguishing color. They are not corrosive to metals and do not leave objectionable stains which cannot be removed. These pellets are supplied by *Tempil Corp.*, 132 West 22nd Street, New York.

**O**NE-PIECE vulcanized fiber is used to give a light-proof design in the No. 406 welding helmet, offered by the Chicago Eye Shield Co., 2300 Warren Boulevard, Chicago. Reinforcing ribs are molded in the sides of the helmet to give it strength and rigidity. Another feature is a newly designed lens holder made so that the entire lens holding unit may be removed by loosening two screws. The cover glass can be removed without the use of tools. Wearing comfort and even weight distribution are claimed.





# THIS WEEK

# ON THE

# ASSEMBLY LINE

By W. F. SHERMAN  
Detroit Editor

*... Spring upturn comes rapidly after unusually high winter sales level for auto industry ... Production jumps to 102,670 and March schedules are being boosted ... Employment climb accompanies manufacturing gain ... Buick expands plant for axle manufacturing and sheet metal ... Appeal awaited on payment of \$3,000,000 to Chrysler employees affected by last strike.*

**D**ETROIT—Signs have appeared in the last week that the spring upturn in automobile production has already begun. These include an unexpected advance in assembly totals and reports that March schedules will be stepped up.

With all the independent producers operating during the week for the first time in many weeks, part of the improvement in the industry is attributable to the independent companies. However, the major increase during the week was made by General Motors. In the GM group, total output was stepped up from 37,355 a week ago to 43,855 units; Chevrolet alone increased the flow on production lines from 21,500 to 26,000 cars and trucks.

This is close to the peak production at Chevrolet so far on this year's models—28,000 vehicles per week for four weeks in December. It is reported that Chevrolet's March schedule will be nearly up to the maximum possible on every working day.

Industry-wide, the trend is upward. The sharp increase last week to 102,670 cars and trucks, compared with 95,050 in the previous week, is taken as a forerunner of more gains to come. The level of production is far above the 75,660 output of a year ago and is nearly double the 1938 output of 56,677 in the corresponding weeks.

Chrysler volume increased last week to 25,865, from 25,790 in the previous

week, although Plymouth declined slightly from 11,915 to 11,875.

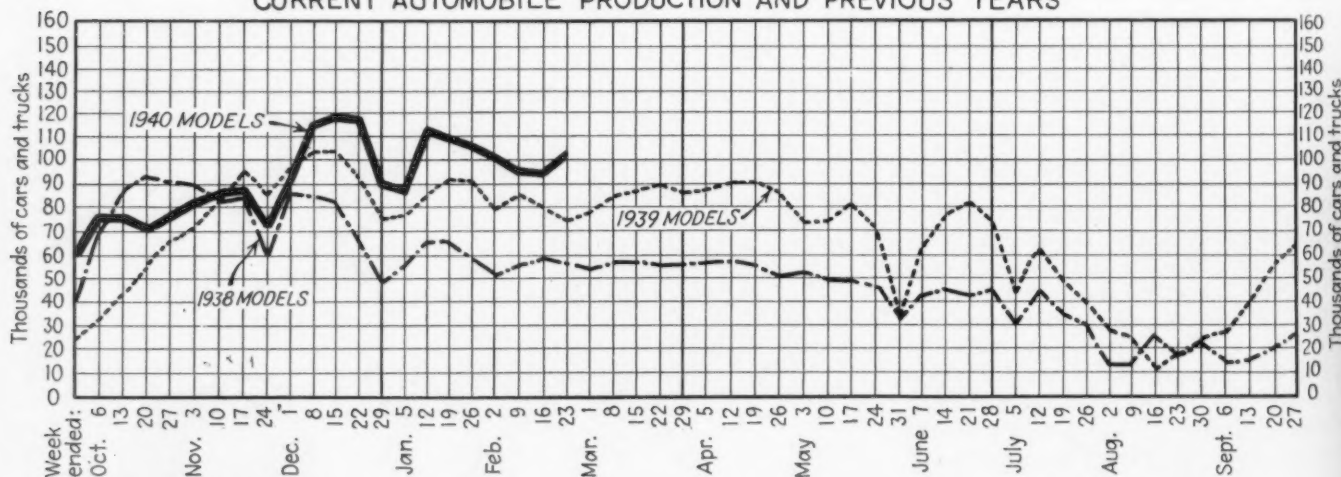
An advance in Ford operations has been indicated, although last week Ford turned out only 19,750 Fords and Mercurys, compared with 20,000 the week previous. Lincoln-Zephyr completed its third week at the 600 level.

A study of "model year production" to date (see chart) indicates assembly of 1,869,720 cars of 1940 vintage since they were put on the market last fall. The year shows increasing promise as the weeks pass.

## Sales Continue to Gain

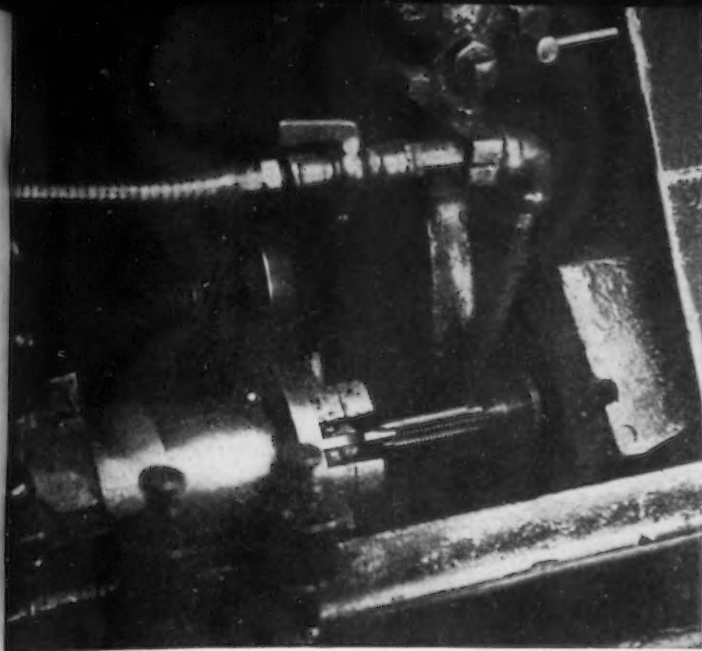
On the heels of a month during which many companies topped all previous January records, sales continued to increase during February. In the first 10 days of the month Chevrolet sales totaled 25,085, which is 13.7 per cent above the 22,067 sales made by Chevrolet during the same period in January. (When it is recalled that Chevrolet production each week has hovered between 22,000 and 27,500, it is apparent that no tremendous inventories have been built up.) A set of substantiating figures is released by

CURRENT AUTOMOBILE PRODUCTION AND PREVIOUS YEARS

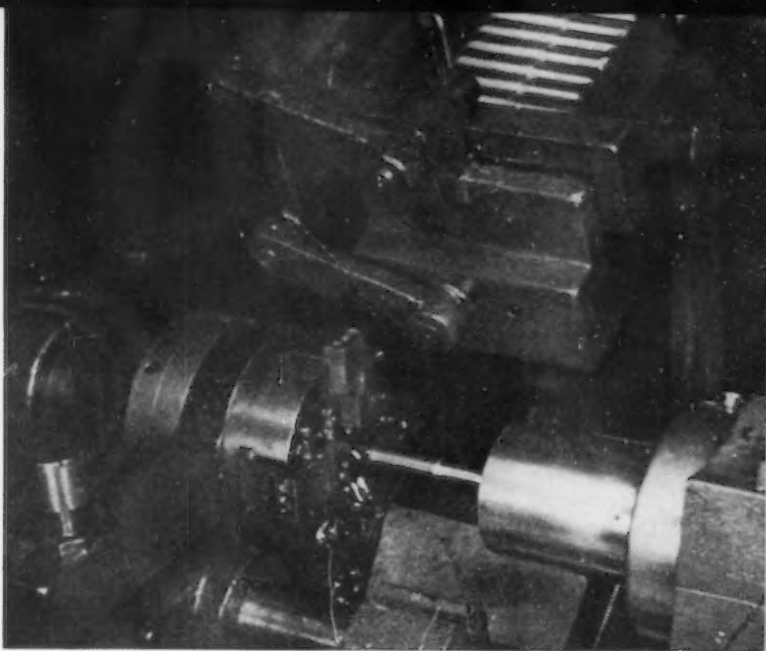


Source: Ward's Automotive Reports

	P R O D U C T I O N C O M P A R I S O N S		
	Oct. Nov. and Dec.	Jan. and Feb. (to date)	Total to date
1938 MODELS	1,032,201	469,632	1,501,833
1939 MODELS	1,014,799	661,445	1,676,244
1940 MODELS	1,162,990	808,730	1,869,720



Machines of this type, designed by G. T. D. Greenfield's own engineers, grind threads with minimum lead error and to extremely close size tolerances.



Even cut-thread carbon taps are threaded by machines that automatically feed, thread and size.

# ACCURATE TAPS REDUCE COSTS

**How G. T. D. Greenfield's modern machinery makes closer tolerances possible**

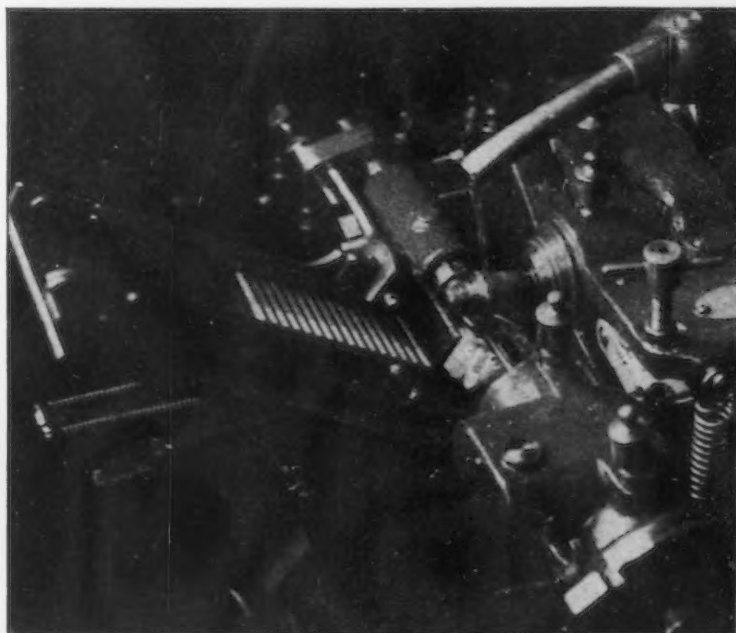
More taps wear out (i. e. wear undersize) than ever break. In terms of tap tolerances, this means that a tap near the "low" limit may produce only a fraction of the finished holes tapped by one near the high limit. To give users a greater average production per tap, Greenfield has developed super-accurate machinery which permits a closer size control than required by standard tap tolerances.

Heat treatment is vital, too. Typical of Greenfield research and leadership here is "Maxi" heat treatment, responsible for amazing performance in threading abrasive or stringy metals.

(Right) The right shape and depth of flute are very important in developing fine cutting qualities and reducing tap breakage.

(Below) This comparator helps to insure correct thread form, which contributes to both accuracy and long tap life.

As the world's largest manufacturer of threading tools, G. T. D. Greenfield has outstanding opportunities to study performance and give its many thousands of customers all over the world the benefit of that wide experience. Call in the Greenfield engineer.

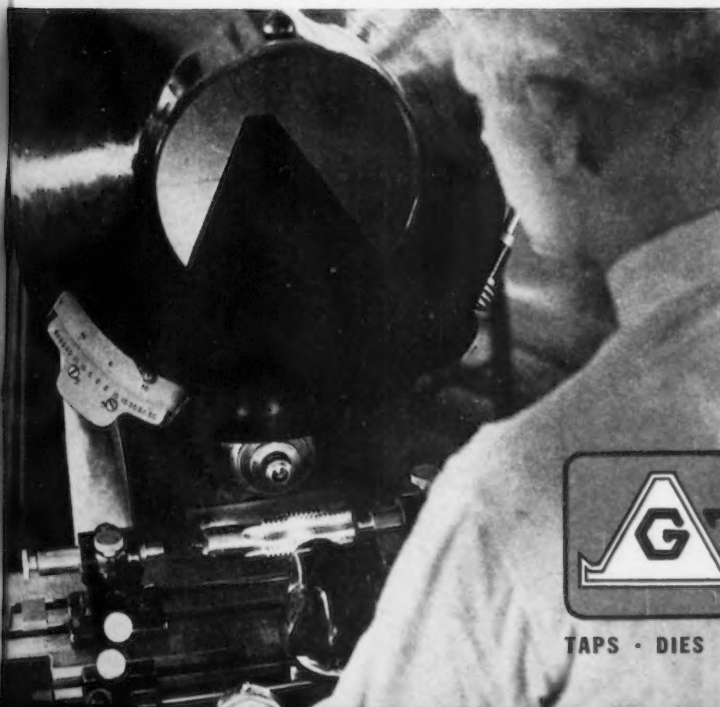


**Greenfield Tap & Die Corporation - Greenfield, Mass.**

Detroit Plant: 2102 West Fort St.

Warehouses in New York, Chicago, Los Angeles and San Francisco

In Canada: Greenfield Tap & Die Corp. of Canada, Ltd., Galt, Ont.



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Pontiac, which sold 4718 cars in the first 10 days of February—a gain of 55.7 per cent over the same period in January this year and 59 per cent over February, 1939. "Spring seems to be already here so far as the sales records are concerned," D. U. Bathrick, Pontiac general sales manager, declared last week.

The healthy condition of the industry has been accompanied by an increase in industrial employment in the Detroit area. The Feb. 15 figure of the Board of Commerce showed actual employment in Detroit and Wayne County factories totaling 380,000, as against 358,000 two weeks earlier and 343,000 a year ago. The index level has risen from 104.9 early in the month to 111.5 at mid-month.

The boom in sales, increases in production so early in the year, and the rising employment index are regarded as distinctly contra-seasonal and indicative of substantially better conditions ahead.

Parts manufacturing plants in many instances are inclined to regard current conditions less favorably because releases and shipping schedules have not gone up rapidly. The explanation is, in part, that spring production has

been anticipated in many cases and the effects already discounted. Particularly in the case of Chrysler, there is evidence that suppliers made good use of the time when Chrysler plants were strike-bound. Suppliers built up inventories and liberal shipments were made after the strike; it may be another week or two before heavy shipments are again required.

#### Steel Buying Improves

From widely scattered plants, although mostly automotive, steel buying has improved. At mid-month or a little later, total sales volume was just about comparable to the January level, but it is generally reported that business came in at an accelerated rate as the month neared its end.

Developments at Ford Motor Co. continue to incite interest. The steel cylinder sleeves which have been in quite general use in Ford engines for more than a year will soon be installed in 100 per cent of the production engines. The final step, from 75 per cent of production, is understood to entail an increase in equipment on the production lines. During the last week it became more apparent that the six cylinder engine is headed rapidly for production stages; interest now

centers on details of exterior appearance of the car and its size.

Reopening of the Racine (Wis.) plant by Nash after a two-year shutdown is not taken here to indicate that the new light Nash will be produced in this plant. Instead it has been reported that the reopening, scheduled within 90 days, will entail the use of the plant as a parts warehouse and service headquarters. Parts now stored at Kenosha and at the Seaman Body plant at Milwaukee will be transferred to Racine. Some small manufacturing operations are also expected to be carried on in the buildings and general plant rearrangement is now under way.

#### Buick Expansion Planned

A new program of plant renewal and expansion, starting with the construction of two new buildings with accompanying docks and receiving and shipping facilities, has been announced by O. W. Young, general manufacturing manager for Buick division of General Motors Corp. Initial construction will include a new plant to house manufacture of axles, with rearrangement of plant and equipment for the production of axle gears, and a large addition to the sheet metal plant.

One factory building is being razed to make way for the new axle plant. Destruction of a 300 ft. section of the present sheet metal plant has been contracted for, according to Mr. Young. Three bridges will be constructed to facilitate interplant communication and shipping. An unusually long conveyor line will be built to carry finished axles from the new plant to the final assembly department.

The new axle plant will be 959 x 138 ft. and will provide 156,000 sq. ft. of floor space, including covered docks 90 ft. deep, providing facilities for simultaneous loading and unloading of 14 trucks and three freight cars. Railroad tracks will be reconstructed adjacent to the building. The addition to the sheet metal plant will be 300 x 52 ft., two stories high, to accommodate a craneway for handling materials.

All of the construction and rearrangement of plant and equipment will be carried on without interrupting Buick production and is expected to be completed by mid-year.

#### Non-Strikers Get Benefits

Almost \$3,000,000 in unemployment compensation benefits has been ordered paid to 27,000 Chrysler employees who were affected by the strike which tied

(CONCLUDED ON PAGE 73)

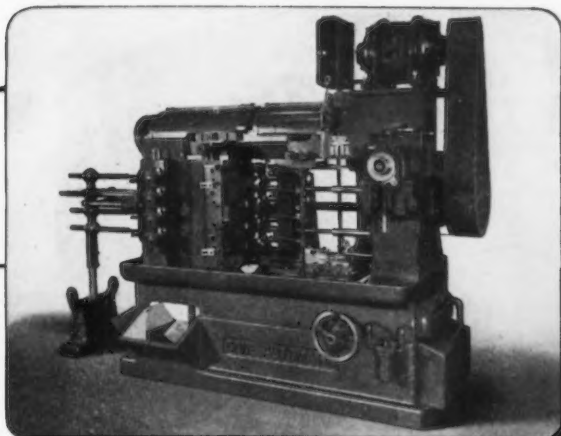
## THE BULL OF THE WOODS

BY J. R. WILLIAMS

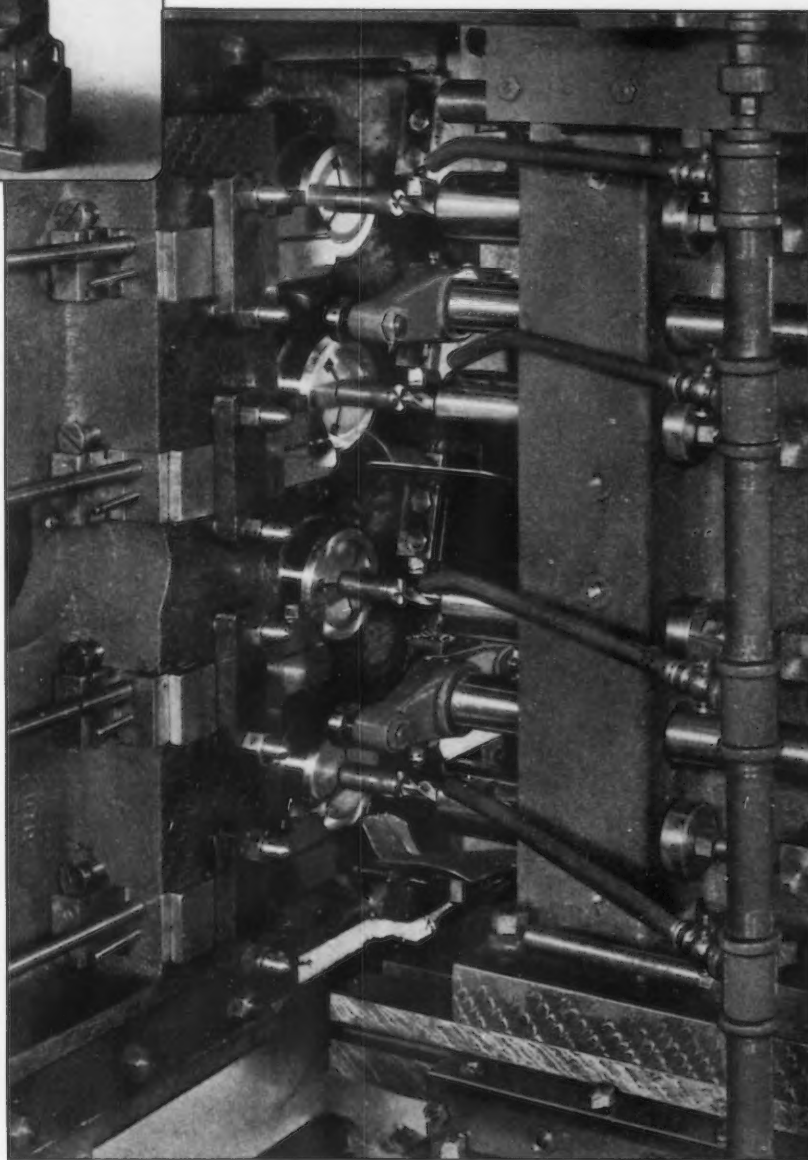




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1 1/4" 4-Spindle Cone  
Vertical Automatic



Close-up of tooling for pro-  
ducing the parts shown above

**THE** job, shown above, is typical of the parts which can be produced exceptionally fast and economically on the 4-Spindle Cone Vertical. One part is finished on each spindle during every cycle of the machine. In this

case four parts are produced in 13 seconds—880 parts per hour at 80% production! If you manufacture parts of similar nature it will pay to learn more about the Cone 4-Spindle Vertical. A new catalog is yours for the asking.

**CONE AUTOMATIC MACHINE CO., INC.,**

**Windsor, Vt., U. S. A.**

# THIS WEEK IN WASHINGTON

*... New Five-Man Labor Board, Wagner Act revision seen possible this session ... Drive on trade associations unlikely ... Weir appointed chairman of G.O.P. national finance committee ... Study of Smith scrap licensing bill postponed.*

By L. W. MOFFETT

*The Iron Age*

WASHINGTON—Abolition of the discredited National Labor Relations Board, together with broad revision of the Wagner Act at the present session of Congress, is provided in a definite plan under consideration by the special House committee which is investigating the board. Despite pressure from organized labor groups and political blocs, it is the general view that legislation to this end can be passed easily in the House but would face great difficulty in the Senate. But so strong is sentiment against the NLRB because of its amazing maladministration of the act, as disclosed at the House committee hearings, that the Senate probably would vote changes in the board set-up and in the law, though not so sweeping as those under study by the special House committee.

Senator Wagner, Democrat, of New York, has been compelled by the special House committee revelations to retreat from his former position in opposition to any changes in the Wagner Act and has introduced a so-called voluntary mediation bill. By many this move as made by Senator Wagner was construed as a means of relieving pressure on the board. But it is said that it may be used by the majority of the Senate Committee on Education and Labor as a foil against the much broader program that will be submitted to the House through its special committee which is investigating the board, rather than directly by its regular Committee on Labor. The upshot may be a House-Senate compromise on labor legislation. Legislation for amendment to the Wagner Act is expected to be introduced in the House early in March.

The outstanding proposal now being considered by the special House com-

mittee was drafted by Charles G. Wood, former Commissioner of Conciliation with the Department of Labor. It would wipe out the present Labor Board entirely, set up a five-man commission with increased powers to investigate, conciliate and arbitrate strikes and lockouts, and consist of two labor divisions. Unlike the Wagner National Mediation bill for voluntary mediation, and by many considered to be largely ineffective, the broad measure, like the Railway Labor Act, provides for compulsory investigation of labor disputes, when necessary, and for a lapse of time before a strike can be called or a lockout be instituted. One division of the proposed labor commission would provide for conciliation and voluntary arbitration and the other would be concerned only with complaints alleging employer interference with the right of employees to organize for purposes of bargaining collectively. Under the plan two members of the commission would be chosen by the President from lists recommended by labor organizations, two would be chosen by employers or from lists submitted by employers' associations, and the four commissioners so selected would recommend a list of three from which the President would select the fifth member.

## Would Notify Commission

Under the Wood bill, an employer, representatives of labor organizations or unorganized employees would be required to notify the commission in a dispute that threatens a strike or a lockout. Moreover, the commission would be authorized to act on disputes on request of state or county officials, mayors or town officials.

If failure followed initial attempt by

the conciliation service to adjust a complaint of employer violation without the expense of a public hearing or protracted delay, the commission would propose arbitration by a state board or by a board selected by the parties engaged in a controversy. Inability of the disputants to agree to arbitration would mean that the commission would hold a public investigation, determine the cause of the strike, find which of the two parties is the more responsible, publish the findings and recommend means of settling the controversy.

In the event the commission or its regional office was not notified within 10 days before a strike or lockout, the commission would hold a public investigation at once and require that cause be shown for conduct that violates the intent of the act, the purpose being to adjust differences without losses in wages and production.

## Discouraging Strikes

The right to strike would be put on a new basis by adding to the strike section of the present Wagner Act a provision that employees or their representatives had "diligently endeavored" to cooperate with the commission to adjust disputes before resorting to the right to strike. Designed to discourage strikes, particularly those in violation of agreements, the provision, in case of a strike, calls for an inquiry by which blame could be fixed and recommendations made. Existing penalties would remain unchanged respecting unfair labor practices, but in adjusting disputes through conciliation employees would not be required either to join or to sever their membership in a labor union. While freedom of employees to bargain collectively through their chosen representatives would be continued, the employer also would be assured of his right to determine the fitness and capacity of his employees "to perform the work required." The Wood proposal provides that this right "shall not be impeded, curbed or regulated."

Certificates for election-chosen representatives for collective bargaining would not bind "members of craft or other established unions without their consent to be included in the membership of a majority union but such members shall not impede or obstruct the right of the majority union to bargain collectively with the employer."

The commission would be set up as

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Machine: Jones & Lamson 7-B Saddle Type Turret Lathe  
Material: X - 1315  
Spindle Speed: 40 R.P.M.  
Cutting Speed: 88 S.F.P.M.  
Feed: .022"  
Depth of Cut: 1⅜"  
Cutting Lubricant: 1 part Sunoco to 20 water



*Courtesy of Jones & Lamson Machine Co.*

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an independent agency in the Department of Labor.

#### Inquiry Continued

Continuance of the Labor Board probe for several months was assured last Friday when the House voted an additional appropriation of \$50,000 for the investigating committee. Present plans provide that after an adjournment of possibly a month, hearings be resumed in Washington and later transferred to industrial centers throughout the country.

While the board said it was done in order to improve administrative functions, its creation of the office of administrative examiner was looked upon as an echo of the House committee inquiry into the board's activities. In particular it was reported that the move was made to appease Board Member William L. Leiserson, who, in testimony before the committee, vigorously criticized Board Secretary Nathan Witt for the latter's administration of his duties. The board named Alexander B. Hawes as chief administrative examiner and will act as deputy to Mr. Witt in the supervision of the administrative phases of cases

but it is reported that the selection of a new deputy does not satisfy the complaint of Mr. Leiserson and therefore fails to heal the breach within the board. Mr. Leiserson wanted Mr. Witt ousted.

Mr. Hawes was assistant general counsel of the board. His new position will relate to case development, the authorization of issuance of complaints concerning unfair labor practices, and to orders directing investigation and hearing in representation cases, maintenance of compliance records and supervision of the board's 22 regional offices whose work will be coordinated with that of the headquarters in Washington.

#### Madden Answers Schram

Board Chairman J. Warren Madden reappeared before the House committee to deny testimony of Chairman Emil Schram of the Reconstruction Finance Corp. that the board had proposed "blacklisting" of alleged violators of the Wagner Act. He said that it was the RFC that, as a guide on the questions of loans, had asked the board for names of alleged violators and that Mr. Schram was "completely mis-

taken" when the latter told the committee that the board opened the negotiations.

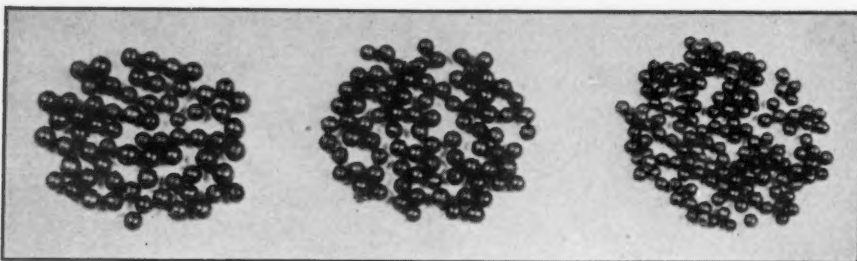
Mr. Madden simply wanted to keep the record straight. By no means did he seek to pass the blame for the "blacklisting" scheme as something reprehensible. On the contrary he said that he would not be ashamed if the board had made the approach.

"I think the whole matter is largely immaterial," said Mr. Madden. "I should not be ashamed of it and I should be quite willing to say we had, but it so happens that we did not. That is the reason I want to make it clear on the record."

Associate Counsel Thomas Emerson of NLRB then told the committee that RFC Associate Counsel Charles M. Wright approached the board first.

From Mr. Schram came this comment: "I was under oath when I testified and I did not lie."

Members of the committee suggested that the subject be pursued no further.



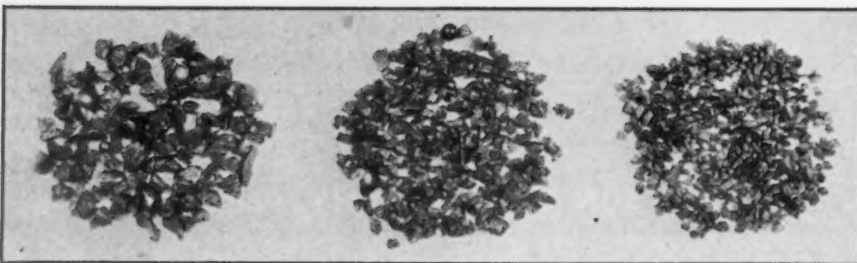
**I**N the period of one year we have built up a very large business with our Heat-Treated Steel Shot and Heat-Treated Steel Grit. This was accomplished on purely a quality product. Our many hundreds of customers, nationally known Concerns, are using our Shot and Grit, and saving money every day, blasting faster with less wear of abrasive. Our heat treating insures toughness and strength, fast blasting and long wearing. Try it in your machine and prove the truthfulness of these statements.

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compromise  
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**A ton or a carload.  
Will match any size.**

## HARRISON ABRASIVE CORPORATION

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## No Drive on Trade Associations Likely

**W**ASHINGTON—Despite energetic efforts of Assistant Attorney General Thurman Arnold to inject new life into the anti-trust laws, the Department of Justice is said to plan no widespread drive against trade associations. When, however, the Department has "evidence of illegal conduct by associations or groups of associations acting in concert," it was said, it will act "as vigorously as the limitations of our organization permit."

With the explanation that NRA greatly stimulated the activities of trade associations and that some of the habits acquired then have been "hard to shake off," Wendell Berge, special assistant to the Attorney General, said: "Trade associations can do much to put and keep their own houses in order . . . the important thing is the fundamental attitude of trade associations toward the nature of our competitive system."

Mr. Berge looks to the ultimate disposition of two cases pending in the Southern District of New York, involving price fixing and production control allegations against two associations, to serve as guides for future trade association conduct.

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supply for  
Ferro-Alloys"*

**Ferro Silicon**

**Ferro Manganese**

**Ferro-Chrome**

**Silico-Manganese**

**Silico-Chrome**

**Simanal**



*Ohio Ferro-Alloys Corporation  
Canton, Ohio*

## Botchford Heads Sierra Iron Co.; 100-Ton Daily Output Seen By 1941

WASHINGTON — Production of 100 tons of pig iron a day by the end of the present year and an ultimate daily output of 500 tons is the plan of the recently organized Sierra Iron Co. of Nevada, according to the Department of the Interior.

The company, as stated in *THE IRON AGE* of Feb. 22, page 70, has just made a 20-year contract for power from the Bonneville dam, preparatory to installation of electric furnaces and construction of a cast iron soil pipe foundry at Vancouver, Wash. It will be the only operation in the country producing pig iron by the electric process.

The department statement regarding the contract erroneously said that the company's president is D. F. Hawkins and that its treasurer is Albert E. Greene. Mr. Hawkins, whose address is given as Los Angeles and Portland, Ore., is vice-president and general

manager, it now is stated. Mr. Greene was described as an electric furnace manufacturer of Seattle, Wash. The president is D. H. Botchford, Los Angeles, who, it was stated, was vice-president and general manager of the Columbia Steel Co., before it was purchased by the United States Steel Corp. Walter E. Hettman, San Francisco, is counsel and assistant secretary of the new company and F. B. Treweek, Los Angeles, is treasurer.

Associated with the company also are E. F. Alt and Sidney S. Brown, identified as being in the iron business in Los Angeles. The present investment of the company is reported to be \$50,000.

The plant, it was stated, will be located at municipal terminal No. 2, on the outskirts of Vancouver. The site is owned by the town of Vancouver and was said to be accessible to four railroads, highway, river and ocean transportation.

the industry included restoration of duty on manganese by modification of the Brazil trade agreement, and establishment of stock piles under the strategic and critical purchasing program consisting exclusively of domestic manganese ores.

### Scrap Hearing Delay Laid to White House

WASHINGTON — White House observations on pending proposals to restrict exportation of iron and steel scrap under a licensing arrangement are understood to have delayed further consideration of the Smith scrap licensing bill by the House Military Affairs Committee.

The nature of the President's comments, said to have been communicated to Washington during Mr. Roosevelt's "mystery trip" through Southern waters, was not known definitely but members of the committee confirmed reports that action on the Smith bill will be delayed.

Chairman Andrew J. May, while declining to comment on the reported Presidential message, conceded that he had heard the rumor and that the committee planned to slow up consideration of the Smith bill for the present.

Mr. Roosevelt's reported communication, tending to substantiate forecasts that the Smith proposal will not be acted upon favorably, was understood to have been prompted by a desire to clarify the Administration's attitude with respect to the Far Eastern situation. Whether Mr. Roosevelt was not completely satisfied with the State Department's presentation, that the matter of foreign policy will not be involved if Congress desires to restrict scrap exports from a national defense standpoint, was not known but it was pointed out that the President's reputed message may indicate that abrogation of the treaty of trade and commerce with Japan is as far as this government cares to go at the present time in displaying disapproval of Japanese activities in China.

In such an event, it was considered likely that the Administration will vigorously oppose the Smith bill on the ground that it would be an imprudent gesture under present circumstances. A report from the State Department on the measure is now in the hands of the Budget Bureau, and when sent to the House committee is expected to shed further light on the Administration's attitude.

## Government's Manganese Ore Difficulties Blamed on Tariff

WASHINGTON — Inability of domestic manganese producers to supply the Government with the grade of ore called for by the Treasury Department's Procurement Division, as indicated by the repeated calls for bids, was attributed last week to the Administration's deviation from an adequate tariff policy and to its tardiness in launching a strategic and critical material purchasing program.

J. Carson Adkerson, president, American Manganese Producers Association, said in a letter reprinted in the Congressional Record at the request of Representative Harold Knutsen, Republican of Minnesota, that while the installation and maintenance of additional beneficiation plant could insure the production of high grade manganese concentrates from low grade ores in this country, this cannot be done unless the industry is stabilized by adequate tariff protection.

The letter, directed to Chairman Robert L. Doughton, of the House Ways and Means Committee, when the committee was considering renewal of the Administration's reciprocal trade agreement program, ex-

pressed the view that the \$100,000,000 strategic and critical material purchasing program had been passed "to cover up" the mistake made since 1936 in sacrificing "the continued development of our own manganese resources for national defense." The manganese bids received by the Procurement Division indicate to him that "possibly we have waited too long already" in building up a stock pile in the interest of defense, Mr. Adkerson said, implying that domestic producers are unprepared because "it requires time to carry forward development work underground and install the necessary plants."

He directed his protest specifically against the reciprocal trade agreement with Brazil, effective since 1936, and estimated that the actual loss in revenue through the reduction of manganese ore duty amounted to \$18,422,320 from 1936 up through the first 11 months of 1939. This money now goes as an additional subsidy to the steel industry, Mr. Adkinson's letter said.

Two proposals advanced by him for encouraging development work and the installation of additional plants in



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Drawbenches for steel and non-ferrous tubes and bars, with conventional electric drive or automatic AC or DC drive for slow starting and acceleration to the drawing speed.

Push button control initiates the completely automatic drawing cycle, automatic arms facilitating removal of the tube or bars.

The automatic draw grip permits quicker interchange of the draw bits for size and for multiple draw.



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APPLIED FOR

Faster grip return with automatic deceleration and air cushioned stop with positive positioning for gripping the tube or bar points, increases production and diminishes point scrap.

We solicit your inquiries for tube and bar drawbenches. We also build complete tube forming, sizing, welding and cut-off equipment.

Wallace W. Kerr, who has devoted the last 20 years to the development of drawbench machinery is now associated with McKay in the engineering and sales of their new line of drawbench machinery and equipment.

## THE McKAY MACHINE CO

ENGINEERS AND MANUFACTURERS OF SHEET, TIN AND STRIP MILL EQUIPMENT  
YOUNGSTOWN, OHIO

# KENNAMETAL STEEL-CUTTING TOOLS

PUT YOU TWO STEPS AHEAD OF COMPETITION

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## BETTER PRODUCTS.

Parts machined with KENNAMETAL have a smoother finish . . . are more accurate in size. In addition, KENNAMETAL machines steel heat-treated up to 550 Brinell at economical high speeds . . . enabling you to use stronger, tougher metals to reduce the weight of your finished product.

STEP  
TWO

## AT LOWER COST. KENNA-

METAL cuts at speeds 2 to 6 times greater than those of high speed steel and with far less "down time" for regrinding tools. The higher hardness range of materials machined with KENNAMETAL

greatly reduces annealing costs . . . and the smooth, accurate finish produced eliminates much of the need for grinding and polishing.

Installation of KENNAMETAL-tipped tools in your shop will help you make a better product at less cost . . . placing you at a definite advantage in the competitive market. Literature on request.

KENNAMETAL  
Chip Breaker Tool

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COIL SPRINGS  
FLAT SPRINGS  
SMALL STAMPINGS  
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SPECIAL SPRINGS

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When you need help in the designing of springs that will give you maximum efficiency at minimum cost, remember our engineers are always ready and willing to co-operate with you.

Years of practical experience, plus equipment that is suited to our needs places us in a position to efficiently fill all orders for wire forms, snap rings, small stampings and flat, coil or special springs.

SEND FOR QUOTATIONS  
**AMERICAN SPRING & MFG. CORP.**  
General Offices at HOLLY, MICHIGAN  
Manufacturing Plants at Holly, Michigan and Belding, Michigan

## Government Orders

WASHINGTON—Iron and steel contracts as reported by the Labor Department's Division of Public Contracts totaled \$1,135,309.66 during the week ended Feb. 17. Machinery awards amounted to \$1,525,929.07 and contracts for non-ferrous metals and alloys aggregated \$197,505.92. Details follow:

### Iron and Steel Products

Doehler Die Casting Co., Pottstown, Pa., War Ordnance, die castings . . .	\$24,150
International Nickel Co., Inc., New York, Navy S&A, cylinder forgings . . .	45,200
Babcock & Wilcox Tube Co., Beaver Falls, Pa., War Ordnance, steel tubing . . .	10,542
Cory & Joslin, Inc., San Francisco, Navy Yards & Docks, piping . . .	53,628
Summerill Tubing Co., Bridgeport, Pa., Phila. Navy Yard, steel tubing . . .	23,709
Warren Foundry & Pipe Corp., New York, WPA, cast iron pipe . . .	13,118
American Bridge Co., Denver, Interior Recl., tracks, gate frames . . .	34,911
Jones & Laughlin Steel Corp., Pittsburgh, Navy S&A, structural shapes . . .	45,586
Apollo Steel Co., Apollo, Pa., Navy S&A, sheet steel . . .	26,347
Lacy Mfg. Co., Los Angeles, Naval Supply Depot, roller frame nests . . .	10,887
Dravo Corp., Pittsburgh, Navy Yds. & Docks, caisson . . .	574,800
Lehigh Structural Steel Co., Allentown, Pa., Navy Yds. & Docks, structural steel . . .	64,137
Arthur J. O'Leary & Son Co., Chicago, Interior Recl., stop-log guides . . .	26,000
May Hardware Co., Washington, D. C., Navy S&A, pliers . . .	20,963
Nicholson File Co., Providence, R. I., Navy S&A, files and rasps . . .	38,755
Delta File Works of the Carver File Co., Philadelphia, Navy S&A, various files . . .	22,829
Rochester Ropes, Inc., Jamaica, N. Y., Phila. Navy Yd., steel cable . . .	18,690
The Hadley Special Tool Co., Inc., Boston, War Ordnance, machine gun parts . . .	81,954

### Non-Ferrous Metals and Alloys

Aluminum Co. of America, Washington, Phila. Navy Yard, rivets and washers . . .	\$13,653
Aluminum Co. of America, Washington, Phila. Navy Yard, aluminum alloy . . .	61,180
Russell, Burdall & Ward Bolt & Nut Co., Port Chester, N. Y., Navy S&A, brass nuts . . .	37,200
Magna Mfg. Co., Inc., Haskell, N. J., Navy S&A, magnesium . . .	10,571
The International Nickel Co., Inc., New York, Navy Purch. Office, nickel-chromium-alloy . . .	27,500
The American Brass Co., Waterbury, Conn., Navy Purch. Office, copper-nickel-alloy tubing . . .	13,720
American-LaFrance-Foamite Corp., Elmira, N. Y., Navy S&A, fire extinguishers . . .	12,776
Walter Kidde & Co., Inc., Bloomfield, N. J., Phila. Navy Yard, pts. for fire extinguishers . . .	20,903

### Other Machinery

Guiberson Diesel Engine Co., Dallas, Tex., War Ordnance, diesel engines . . .	\$592,187
Alliance Machine Co., Alliance, Ohio, War Ordnance, drop hammer . . .	28,188
Jones & Lamson Machine Co., Springfield, Vt., War Ordnance, turning lathes . . .	43,716
Cincinnati Milling Machine & Cincinnati Grinders, Inc., Cincinnati, War Ordnance, milling machines . . .	30,908
Cincinnati Milling Machine & Cincinnati Grinders, Inc., Cincinnati, War Ordnance, milling machines . . .	18,887
C. H. Gosiger Machinery Co., Dayton, Ohio, War Air Corps, precision lathes . . .	27,574
W. E. Shipley Machinery Co., Philadelphia, Phila. Navy Yard, drilling machine . . .	12,951
Vandeyck Churchill Co., Philadelphia, Phila. Navy Yard, turret lathe . . .	10,675
National Twist Drill & Tool Co., Detroit, Navy S&A, twist drills . . .	97,666
Gisholt Machine Co., Madison, Wis., Navy S&A, turret lathes . . .	10,275
W. E. Shipley Machinery Co., Phila.	

delphia, Phila. Navy Yard, milling machines .....	13,710
Lodge & Shipley Machine Tool Co., Cincinnati, Navy S&A, engine lathes .....	33,202
Tidewater Supply Co., Inc., Norfolk, Va., Navy S&A, lathes .....	17,711
Orton Crane & Shovel Co., Chicago, Navy Yards and Docks, crane locomotive .....	26,025
Harnischfeger Corp., Milwaukee, Navy Yards & Docks, bridge cranes .....	68,810
Judson-Pacific Co., San Francisco, Navy Yards & Docks, bridge cranes .....	16,006
Harnischfeger Corp., Milwaukee, Navy Yards & Docks, bridge crane .....	14,295
McKiernan-Terry Corp., Harrison, N. J., Navy S&A, capstans .....	13,700
Orton Crane & Shovel Co., Chicago, Navy Yards & Docks, locomotive cranes .....	263,825
Victor H. Browning & Co., Inc., Willoughby, Ohio, Navy Yards & Docks, bridge crane .....	12,000
Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y., Navy Yards & Docks, wall cranes .....	36,200
Bay City Shovels, Inc., Bay City, Mich., Interior Reel, crawler cranes .....	19,700
Crane Co., San Diego, Cal., Naval Supply Depot, steel valves .....	15,326
Hahn Engineering Co., New York City, Navy Yards & Docks, coal and ash handling equipment .....	22,355
American Elevator & Machine Co., Inc., Louisville, Navy Yards & Docks, elevators .....	20,870
Wilcox Rich Division Eaton Mfg. Co., Detroit, Phila. Navy Yard, seats, valves .....	28,946
American Water Softener Co., Philadelphia, Navy Marine Corps, purification units .....	15,960
Star Brass Mfg. Co., Boston, Boston Navy Yard, relief valves .....	14,256

### Navy Department Contracts

WASHINGTON—The Navy Department's Bureau of Supplies and Accounts has awarded the following contracts:

Circle Wire & Cable Co., Maspeth, N. Y., cable, \$51,471; Henry Prentiss & Co., Inc., New York City, heavy duty shapers, \$6,614; Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y., steel nuts, \$6,276; Consolidated Aircraft Corp., San Diego, Cal., parts to incorporate changes in aircraft, \$7,904; Blanchard Machine Co., Cambridge, Mass., surface grinder, \$7,721.

Struthers Wells-Titusville Corp., Titusville, Pa., windlasses (assemblies), \$113,124; Pittsburgh Screw & Bolt Corp., Pittsburgh, bolts and nuts, \$31,514; C. Hager & Sons Hinge Mfg. Co., St. Louis, hinges, \$6,469; Pawtucket Mfg. Co., Pawtucket, R. I., tap rivets, \$6,200; Lindberg Engineering Co., Chicago, electric furnace, \$5,478; Norton Mfg. Co., Muskegon Heights, Mich., metal shaper, \$13,150.

Ladish Drop Forge Co., Cudahy, Wis., plunger forgings, \$8,534; American Tool Works Co., Cincinnati, radial drills, \$7,997; General Cable Corp., Cincinnati, \$64,872; Delaware Tool Steel Corp., Wilmington, rivet sets, \$6,013.

### War Department Awards

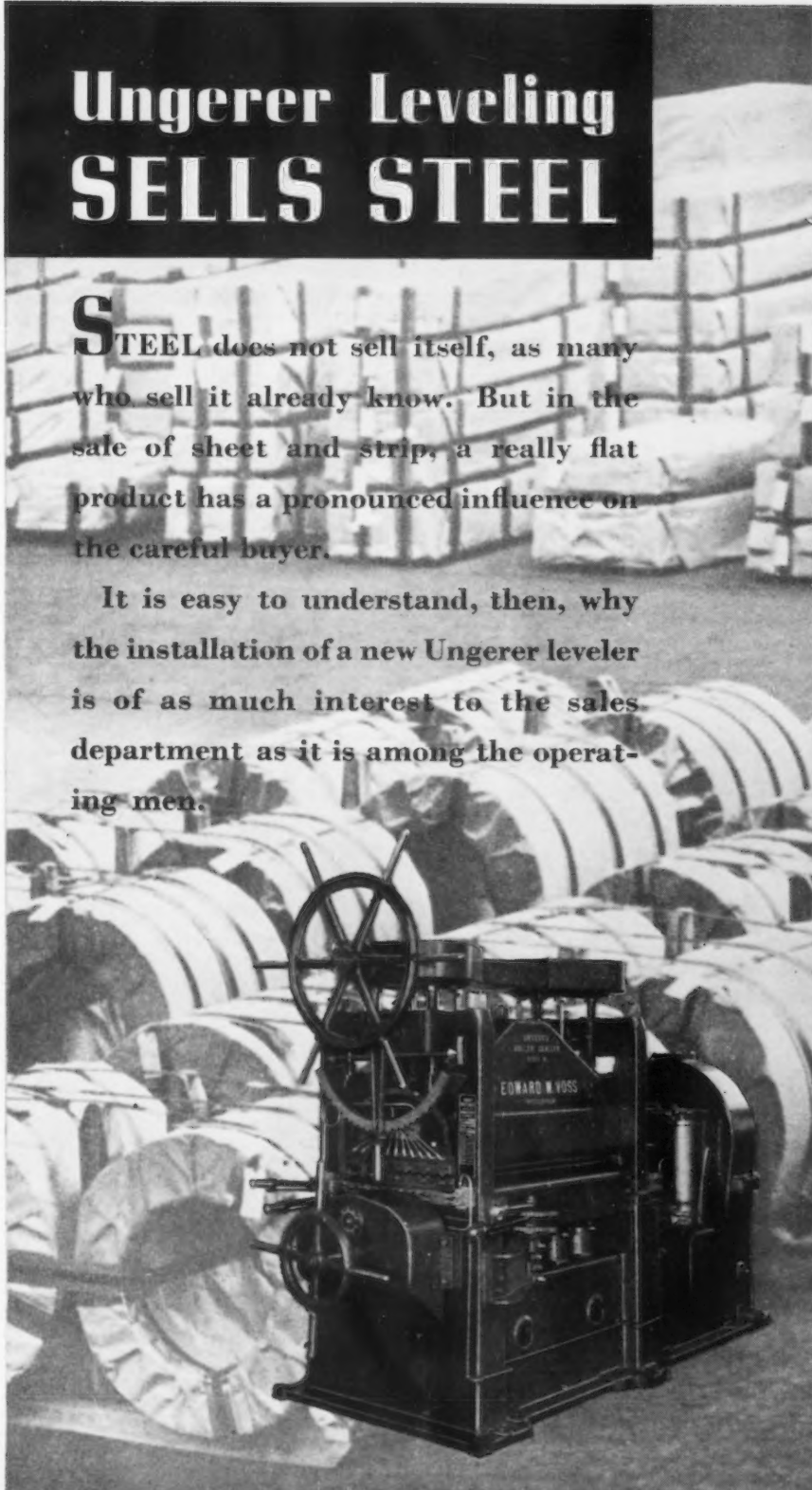
WASHINGTON—The War Department awarded contracts for the two-week period ended Feb. 15 to these companies:

Seovill Mfg. Co., Waterbury, Conn., primer bodies, \$122,875; Standard Pressed Steel Co., Jenkintown, Pa., heads for primers, \$38,306; Wright Machine Co., Worcester, Mass., body plugs for primers, \$10,399; Sperry Gyroscope Co., Inc., Brooklyn, N. Y., directors with accessories, spare parts, \$260,771; Bausch & Lomb Optical Co., Rochester, N. Y., flank spotting instruments, \$57,343; Bendix

## Ungerer Leveling SELLS STEEL

**S**TEEL does not sell itself, as many who sell it already know. But in the sale of sheet and strip, a really flat product has a pronounced influence on the careful buyer.

It is easy to understand, then, why the installation of a new Ungerer leveler is of as much interest to the sales department as it is among the operating men.



## Edward W. Voss MACHINERY

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Aviation Corp., Brooklyn, N. Y., synchronous repeaters, \$12,540.

For steel rods—Allegheny Ludlum Steel Corp., Watervliet, N. Y., \$13,206; Bethlehem Steel Co., Bethlehem, Pa., \$12,990; Carpenter Steel Co., Reading, Pa., \$13,206; Crucible Steel Co. of America, Reading, Pa., \$12,990.

American Brass Co., Waterbury, Conn., cartridge brass cups, \$191,700; Lloyd & Arms, Inc., Philadelphia, recondition job lathe, \$1,911; Sullivan Machinery Co., air compressor, measuring meter, \$33,291; Aldrich Pump Co., Allentown, Pa., hydraulic pumps, \$23,360; John J. Normoyle Co., Moline, Ill., metal cutting band saw, \$1,179; Alliance (Ohio) Machine Co., steam drop forging hammer, \$27,605; Cincinnati (Ohio) Milling Machine & Cincinnati Grinders, Inc., milling machines, \$55,254; E. W. Bliss Co., Toledo, double crank

press, \$2,998; Bardons & Oliver, Inc., Cleveland, selective speed turret lathe, \$5,305.

American Chain & Cable Co., Inc., Bridgeport, Conn., abrasive cutting machine, \$3,122; Monarch Machine Tool Co., Sidney, Ohio, tool room lathes, \$10,830; Hevi-Duty Electric Co., Philadelphia, electric furnaces, \$2,851; Leeds & Northrup Co., Philadelphia, electric furnace, \$3,443; Henry Prentiss & Co., New York, inclinable punch presses, \$3,470; Union Twist Drill Co., Athol, Mass., universal grinding machine, cutter and reamer, \$2,850.

Kearney & Trecker Corp., Milwaukee, vertical milling machine, \$13,211; Morton Mfg. Co., Muskegon Heights, Mich., horizontal boring, drilling, milling and planing machine, \$126,490; Smalley General Co., Bay City, Mich., thread, milling

machine, \$12,093; Warner & Swasey Co., Cleveland, universal turret lathes, \$21,043; Hendey Machine Co., Torrington, Conn., horizontal metal shaper, \$2,884; Racine (Wis.) Tool & Machine Co., power hacksaw, \$1,789; R. K. LeBlond Machine Tool Co., Cincinnati, sliding bed gap lathe, \$13,921; Jones & Lamson Machine Co., Springfield, Vt., turning lathes \$13,148; comparator and measuring projectors, \$7,372.

For inspection gages—Vinc Tool Co., Detroit, \$15,487; Brown & Sharpe Mfg. Co., Providence, R. I., \$2,219; West & Dodge Thread Co., Inc., Boston, \$1,281; Federal Products Corp., Providence, R. I., \$1,490; Pratt & Whitney division, Niles-Bement-Pond Co., West Hartford, Conn., \$8,347; Troy Tool & Die Co., Detroit, \$3,034; Barker Tool Die & Gage Co., Detroit, \$1,790.

Bendix (N. J.) Aviation Corp., Eclipse Aviation Division, energizer assemblies, \$54,504; United Aircraft Corp., Hamilton Standard Propellers Division, East Hartford, Conn., propeller assemblies and sets of controls, \$319,725.

For cable—General Cable Corp., Cincinnati, \$61,880; General Electric Co., Schenectady, N. Y., \$34,353; Phelps Dodge Copper Products Corp., New York City, \$15,324; Circle Wire & Cable Corp., Maspeth, N. Y., \$14,799; Okonite Co., Hazard Insulated Wire Works Division, Chicago, \$34,730.

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Write for Bulletin R-21A and see the features that make this High-Speed Super-Service Radial so outstanding in convenience, speed, ease of operation and productivity. Arrange to see one of these machines in operation. It is making money for hundreds of users. To cut overhead rates and production costs this machine should be working for you now.

# CINCINNATI BICKFORD

### Army Educational Orders

WASHINGTON—The War Department announces contracts totaling \$2,614,735 under the Army's educational orders program have been awarded to these companies:

For shell forging and related items—Colorado Fuel & Iron Corp., Denver, \$251,674; Taylor-Wharton Iron & Steel Co., Easton, Pa., \$209,217; Chrysler Corp., Detroit, \$67,732; Pressed Steel Car Co., Inc., Pittsburgh, \$119,832; Tennessee Coal, Iron & Railroad Co., Birmingham, Ala., \$130,350; Pittsburgh Forgings Co., Coraopolis, Pa., \$36,364; Chevrolet Motor Division, General Motors Corp., Detroit, \$36,127.

For shell machining and related items—Key Co., East St. Louis, Ill., \$164,205; Minneapolis-Moline Power Implement Co., Minneapolis, \$139,628; Omaha (Neb.) Steel Works, \$161,658; Armstrong Cork Co., Lancaster, Pa., \$85,165; J. B. Beal Corp., Shreveport, La., \$108,770; Continental Gln Co., Birmingham, \$72,521; Chrysler Corp., \$110,616; Carling Valve & Mfg. Co., Williamsport, Pa., \$58,902; General Railway Signal Co., Rochester, N. Y., \$102,560; Kingston Products Corp., Kokomo, Ind., \$44,372.

Murray Co., Atlanta, Ga., \$91,206; New York Air Brake Co., New York City, \$79,552; Robbins & Myers, Inc., Springfield, Ohio, \$85,170; Stockham Pipe Fittings Co., Birmingham, \$69,957; U. S. Machine Corp., Lebanon, Ind., \$38,055; Wheland Co., Chattanooga, Tenn., \$66,758; Chevrolet Motor Division, General Motors Corp., Detroit, \$100,850.

The Duraloy Co., Scottsdale, Pa., centrifugal castings and related items, \$148,920; Eastman Kodak Co., Rochester, N. Y., telescope and related items, \$34,566.

### ICC Cancels Trucking Rate

WASHINGTON—The Interstate Commerce Commission has ordered cancellation of a tariff schedule filed by the Royal Transportation Co., Baltimore, proposing a motor truck rate of 30c. per 100 lb., minimum 40,000 lb., on iron and steel articles from Pittsburgh and Aliquippa, Pa., to Baltimore. This is also the rail rate and volume minimum.

## 1000 Expected at A.I.S.E. Spring Conference at Cincinnati

CINCINNATI—An attendance of more than 1000 steel mill executives and operating engineers is expected at the annual spring conference of the Association of Iron and Steel Engineers to be held at the Hotel Netherland-Plaza here April 1 and 2.

The following papers will be given at the morning session on April 1: "Electrical Features of the Armco Slabbing Mill," by A. F. Kenyon, steel mill engineer, Westinghouse Electric & Mfg. Co., East Pittsburgh; "Factors to be Considered in Modernizing Existing Rolling Mills," by C. H. Hunt, consulting engineer, Pittsburgh; "Strip Mill Finishing Equipment," by D. A. McArthur, chief engineer, Wean Engineering Co., Warren, Ohio; and "Ward-Leonard Control for Strip Mill Auxiliary Drives," by E. S. Murrah and H. W. Poole, steel mill section, industrial department, General Electric Co., Schenectady, N. Y.

The evening session will have two papers on the following subjects: "Improvements in Open Hearth Design and Operation," by L. F. Reinartz, manager, Middletown division, American Rolling Mill Co., Middletown, Ohio; and "Problems in the Operation of Wide Strip Mills," by G. D. Tranter, general superintendent, American Rolling Mill Co., Middletown.

In the afternoon of April 1, an inspection trip will be made to the Andrews Steel Co., Newport, Ky. On April 2 an inspection tour of the entire properties of the American Rolling Mill Co. at Hamilton and Middletown, Ohio, will be conducted. The hot strip mill at the Middletown plant has recently been rearranged and modernized and at present has a capacity of 65,000 net tons per month.

### Weir Chosen G.O.P. Finance Chairman

WASHINGTON—Ernest T. Weir, chairman, National Steel Corp., and president, American Iron and Steel Institute, last week was appointed chairman of the Republican National Finance Committee. Announcement of the appointment was made by John Hamilton, chairman of the Republican National Committee, which presented a sketch of Mr. Weir's

life. It was pointed out that the steel executive worked his way up in the steel business from an office boy at \$30 a week, became head of National Steel in 1939, that his company is famous for having made a profit every year during the depression, and that Mr. Weir has been insistent that the United

States take every precaution to keep out of war.

### \$1,088,330 Generator Contract

WASHINGTON—The Bureau of Reclamation has awarded a \$1,088,330 contract to Westinghouse Electric & Mfg. Co., Denver, for three 30,000 kva. generators for installation at Parker Dam power plant, 155 miles downstream from Boulder Dam on the Colorado River.

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A NUISANCE**



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**WITH ALVEY-FERGUSON**  
**INDUSTRIAL WASHING MACHINES**

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## Canadian Business Expanding Under Stimulus of War Orders

**T**ORONTO—Favorable improvement featured business in the Canadian iron and steel markets during the past week or 10 days, the betterment largely being due to increased demand for steel for war needs. The placing of millions of dollars in contracts for war supplies has

resulted in sharp increase in demand for materials for the manufacture of shells and guns as well as the building of aircraft and ships, and also has stimulated building trades, creating heavier demand for structural steel and reinforcing bars.

According to a statement just re-

leased by Minister of Finance Ralston in Ottawa, Canada's first year of war will cost the country \$375,000,000 and will increase to at least \$500,000,000 for the fiscal year ending March 31, 1941. Expenditure to Sept. 1, next, will include, army, \$197,000,000; air force, \$88,000,000; Canada's share in the British Commonwealth Air Training Plan, \$50,000,000, and Navy, \$40,000,000.

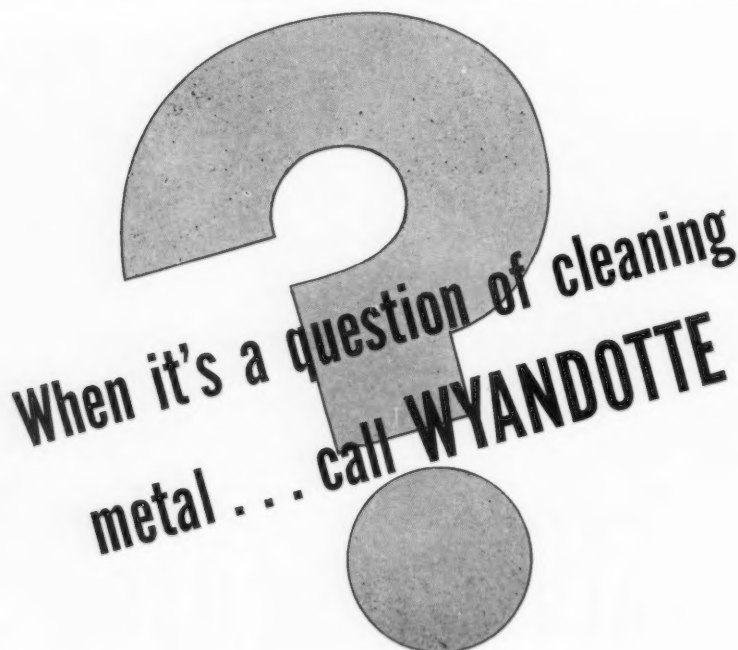
These sums will be augmented by the placing of British contracts in Canada and other war expenditure by many hundreds of millions of dollars more. While the above expenditures will be made by the Canadian and British governments, they also include large purchases in the United States and other countries.

### Additional Airplane Contracts

War contracts placed by the Canadian War Supply Board during the week reached a total of \$10,586,516, which included contracts for 500 aircraft and supplies at a cost of \$7,273,672, for use in the British Commonwealth Air Training Plan. The planes, all of which will be constructed in Canada, are for the most part Harvard advance flying trainers and de Havilland Tiger Moths. The airplane contracts were placed as follows: Noordyn Aviation, Ltd., Montreal, \$3,001,971; de Havilland Aircraft of Canada, Ltd., Toronto, \$2,057,845; Irvin Air Chute, Ltd., Ottawa, \$1,100,000; Fleet Aircraft, Ltd., Fort Erie, Ont., \$1,038,675, and Ottawa Car & Aircraft, Ltd., \$9,574.

Other contracts include, Coulter Copper & Brass Co., Ltd., Toronto, \$18,480; Carbide & Carbon Chemicals Corp., New York, \$13,000; International Silver Co. of Canada, Ltd., Hamilton, \$25,900; Anglo-Canadian Wire-Rope Co., Ltd., Montreal, \$30,113; Vulcan Iron Works, Ltd., Winnipeg, Man., \$7,605; General Steel Wares, Ltd., Ottawa, \$7,920; Metallic Roofing Co., of Canada, Ltd., Toronto, \$100,971; Firestone Tire & Rubber Goods Co., Hamilton, \$62,350; International Harvester Co., Ltd., Ottawa, \$27,007; Chrysler Corp. of Canada, Ltd., Windsor, \$11,174; T. E. Ryder Machinery Co., Ltd., Montreal, \$10,481; Northern Electric Co., Ltd., Montreal, \$150,937; Canadian Telephone & Supplies, Ltd., Toronto, \$160,615; Canadian Westinghouse Co., Ltd., Ottawa, \$42,725.

Munitions contracts include: British War Office, \$307,000; United States Ordnance Engineers, Inc., Cleveland, \$123,775; British Metal Corp. (Canada), Ltd., Montreal, \$30,635; Con-



For more than a third of a century, metal finishers have been calling Wyandotte for expert help in cleaning metal prior to finishing. Most successful metal men have found that this is the quickest and the surest way to help solve the many problems that keep cropping up in the metal-finishing department.

Whether your problem is one of cleaning for a *new* finish, or of finding a swifter, surer, or more economical way to prepare metal for a well-established finish, you, too, will find that Wyandotte Metal Cleaning Compounds and Wyandotte Service will provide the right answer. For more information about Wyandotte service to metal finishers, write to The J. B. Ford Sales Company, Wyandotte, Michigan.





solidated Mining & Smelting Co. of Canada, Ltd., Montreal, \$30,635; Canadian Industries, Ltd., Montreal, \$10,368.

Construction contracts went to Acadia Construction Co., of Halifax, N. S., for work on Royal Canadian Air Force station at Dartmouth, N. S., at \$650,000.

In addition to the sharp increase in war contract placements, new business is appearing in increasing volume for general non-war demands.

#### More Railroad Orders Ahead

Rolling stock contracts of a substantial nature are pending and it is stated that other large orders will be ready for Canadian Car & Foundry Co., Montreal; Eastern Car Co., Amherst, N. S., and National Steel Car Corp., Hamilton, Ont., when they have completed construction of rolling stock now on order for the Canadian National and Canadian Pacific railways. Official announcement is made that tenders are being received for new equipment for the Canadian National Railways, to cost \$1,500,000 and to include 150 ballast cars, 25 baggage cars and five mail and express cars.

Demand for sheets and plates continues heavy in the Canadian markets and it is stated that some shipbuilding concerns which recently closed contracts for anti-submarine craft have been held up in starting work owing to delay in obtaining delivery of steel supplies. Much of the steel required in this work will be obtained in the United States and in addition to contracts already placed across the line, other large orders are pending. Announcement is made from Ottawa regarding early contract placements for other types of naval craft as well as for freighters and merchant ships which will run to many millions of dollars. This new business will be placed both for the Canadian and British governments.

Canada's production of sheets and plates has been contracted for several months in advance and consumers in need of immediate supplies are placing orders with the warehouse operators. The automotive industry also is furnishing better demand for sheets, and good forward delivery contracts are reported from the electric stove and refrigerator concerns. Canada's capacity for the production of these materials is being increased with new plant additions under way at the Algoma Steel Corp., Sault Ste. Marie, Ont.; Steel Co. of Canada, Ltd., Hamilton, Ont., and Dominion Steel & Coal Corp., Sydney, N. S.

#### ... GREAT BRITAIN ...

*... Foreign arrivals of scrap and semi-finished easing steel stringency*

**L**ONDON, Feb. 27 (By Cable)—Though British production continues at a high level, priority consumers are still pressing for deliveries and many works are in arrears. Several works are exploring possibilities of plant expansions but raw material is a serious problem. Large arrivals of

foreign scrap and semi-finished steel are easing the stringency but sheet and tin plate works are complaining of inequality in distribution.

Shipyards are forwarding large quantities of specifications, ship steel berths being reoccupied almost as soon as emptied. Delivery dates on new commercial orders of most classes of steel are extended many weeks so that export business has been greatly restricted, though the demand is strong.

There is a big demand for tin plate

**PH  
&  
Zip-Lift  
HOISTS**



## SAVE MONEY in dozens of places around your plant

You may be surprised to learn how many opportunities exist in your plant — where savings are yours for the taking. Whether it's over a machine tool or work bench — in processing, production, or assembly — wherever loads are frequently moved, the Zip-Lift gives you lower handling cost. This thoroughly reliable electric hoist costs you only a little more than the cheapest, yet gives you a lot more for your money. Why not investigate? Write us today for your copy of Bulletin H-2.

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COMPRESSORS

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many types and sizes



Type "Y"  
Compressor

Two-cylinder, two-stage, air-cooled, for continuous operation against 200 lbs. pressure, sizes 3.6 to 41 cu. ft. Controlled combined pressure and splash lubrication. Unloader interlocked with lubricating system to prevent delivery of air when oil supply is depleted. Low power cost. Motors for any commercial circuit. Mounted complete on tank as shown, or on bed plate for sill installation. Catalog 2051. Write for prices.

Westinghouse  
AIR BRAKE CO.  
Industrial Division  
PITTSBURGH, PA.

but makers are sold several months ahead. The shortage of steel has caused tin plate production to fall to 66 per cent and unfilled orders are now about 9½ million base boxes.

Continental steel works are heavily sold for home defense and northern European orders.

## Britain Will Need More Imported Scrap

LONDON—Record steel output has brought the problem of raw materials to the fore, consumption of scrap being on a larger scale than ever before. Shipbreaking, usually an abundant source of scrap, is apparently at a standstill for the duration of the war, but to make up for this, imports are arriving steadily and the national scrap collection campaign has yielded nearly 100,000 tons of useful metal. Moreover, imports of foreign ore are on a substantially larger scale than before the war, while the output of domestic ironstone has also been expanded.

Domestic supplies of semi-finished steel for the rerolling mills have been augmented by substantial deliveries from the Continent, while large imports of steel ingots and pig iron are also being landed.

If output is maintained at the present rate, the problem of raw materials is bound to increase in importance. It is the policy of the industry to absorb all available domestic scrap before further increasing imports but the domestic supply, though substantial, is limited, and at the present rate of absorption an increase in scrap imports from abroad appears a certainty.

## Personnel Tests Suggested To Detroit Industry

DETROIT—Personnel executives in Detroit industry on Feb. 19 attended a special session on "Psychology in Industry" sponsored by the Society for the Advancement of Management. Dr. Harry J. Baker, director of the Psychological Clinic for the Detroit Board of Education since 1920, declared that personnel should undergo tests as exacting as those devised for testing material. Various aspects of "human research" were discussed along with the question of whether such research can be as productive of industrial efficiency as engineering research. On March 18 the society will review and discuss Dr. Baker's discussion.

## . . . OBITUARY . . .

OTTO LUNDELL, 60 years old, president of Michigan Tool Co., Colonial Broach Co. and Detroit Tap & Tool Co., all of which he founded, died Feb. 22 in Fort Lauderdale, Fla. Mr. Lundell, who came to this country from his native Sweden a little more than three decades ago, had been actively engaged in the manufacture of tools and machines in Detroit since about 1914. He was born in Floby, Sweden, on Nov. 8, 1879, and came to this country in 1906. Mr. Lundell retired because of illness a year ago.

♦ ♦ ♦

TERRAH P. KENNEDY, service engineer in Detroit for American Chemical Paint Co., died in that city recently. He was 43 years old and had lived in Detroit for 21 years.

♦ ♦ ♦

JOSEPH M. MONFILS, 35 years old, in charge of gage inspection and sample inspection for Budd Wheel Co., Detroit, died as the result of a heart attack on Feb. 3. Mr. Monfils had been with the Budd company for 12 years and previous to that was with Hudson Motor Car Co.

♦ ♦ ♦

RAY B. NEEDHAM, Cleveland representative for Alliance Steel Tank Co., Alliance, Ohio, died Feb. 18. For 17 years until 1930 he was manager of the structural steel department of Van Dorn Iron Works Co., Cleveland.

♦ ♦ ♦

JOSEPH HALLS, Youngstown engineer, died Feb. 18 at Daytona Beach, Fla. His career included service as superintendent for United Engineering & Foundry Co., General Fireproofing Co. and Truscon Steel Co. He was 70 years old.

♦ ♦ ♦

M. S. MILBURN, treasurer of Alliance Machine Co., Alliance, Ohio, died in Alliance, Feb. 10, aged 88 years.

♦ ♦ ♦

O. F. A. SANDBERG, a partner in the widely known firm of Messrs. Sandberg, consulting engineers, London and New York, died in London on Feb. 15, aged 61 years. During the World War, he was adviser on steel to the British Ministry of Munitions for work in the United States and Canada. For his services he was created an O.B.E. in 1918.

♦ ♦ ♦

HAROLD A. OSGOOD, vice-president of the Fulton Iron Works, St. Louis, died at a hospital there after a long illness. He was 54 years old. After gradua-

tion from Harvard University he joined the operating department of the Wabash Railway. After 12 years there, he joined the Fulton Iron Works as comptroller about 20 years ago. Later he became vice-president. In 1937, he was appointed a member of a national commission to study technological trends, and helped write a section on the future of transportation.

### Allies to Spend Billion For Aircraft in U. S.

**A**IRCRAFT orders amounting to as much as \$1,000,000,000 will be awarded companies in the United States, the British and French Purchasing Commissions announced this week. These agencies, indicating that 75 per cent of Allied buying at present is in the field of aviation, said:

The placing of vast additional orders for American aircraft depends on a number of factors. The two most important include the demands of the United States Government and commercial aviation, and the solving of the production problems of those industries closely allied to aviation such as engine manufacturers and machine tool makers. These problems are being carefully investigated at the present time.

"If successfully carried out, the new program of the Allied governments may be expected to place the United States in a supreme position where airplane production is concerned and thus insure for American aircraft manufacturers and allied industries a position of leadership similar to that enjoyed by American automobile manufacturers.

An average of \$9,000,000 a week, chiefly for airplanes, machine tools and chemicals, has been spent in the United States by England since establishment of the British Purchasing Commission in mid-November.

### Wellman Backlog \$934,000

**C**LEVELAND — Wellman Engineering Co. had unfinished business totaling \$934,000 on its books at the end of 1939. New business booked by the company last year totaled \$1,751,000 of which \$1,250,000 was received in the last five months. The company, which manufactures steel mill equipment and ore and coal handling machinery, reported a net loss for 1939 of \$63,000 compared with 1938 income of \$38,595.

### Acetylene Association Program Is Completed

**F**OUR or more technical sessions, a panel discussion of oxy-acetylene machine-cutting, and a number of informal round-table meetings, preceded by demonstrations of various oxy-acetylene processes, have been arranged for the 40th convention of the International Acetylene Association, to be held at the Schroeder Hotel, Milwaukee, April 10, 11 and 12.

One technical session, on the afternoon of April 10, will include papers on welding of carbon-molybdenum pipe, welding of industrial piping, developments in silver soldering, and the layout and management of a modern welding shop. Another session, held simultaneously, will be devoted to the general subject of reclamation, repair and maintenance and will include papers on use of oxy-acetylene process for repair work in foundries,



**"For our HEAVIEST loads we use LIGHTWEIGHT chain!"**  
says steel mill pickling superintendent

Monel chain is available in link and forged sprocket chain. A complete line of chain accessories, such as hooks, special lifting links, U bolts, open links, etc. of Monel are regularly supplied.

Which would you consider the safer:  $\frac{3}{4}$ " chain over 6 years old...or  $1\frac{1}{4}$ " chain only 9 months old? The newer, heavier chain, naturally. Yet see what this user reports:

"In spite of the great difference in size, whenever we have particularly severe loads, we use the  $\frac{3}{4}$ " Monel chain. Though over six years old, we find it reliable and not subject to sudden breaks."

Monel pickling chain is made from hot-rolled Monel rod, formed in specially designed dies and the links welded. It is stronger than equivalent sizes of steel chain, and very much stronger than the cast acid-resisting type. Even more important, Monel chain and other pickling equipment resists corrosion by pickling acids, retains its strength, and so is good for years of trouble-free, economical service.

More information? Write for "Equipment Designs for the Pickle House" and "A Good Start to a Better Finish." Address:

**THE INTERNATIONAL NICKEL COMPANY, INC., 67 WALL STREET, NEW YORK, N. Y.**

**MONEL**

"Monel" is a registered trade-mark of The International Nickel Company, Inc., which is applied to a nickel alloy containing approximately two-thirds nickel and one-third copper.



steel mills, railroads, shipyards, and on farms.

The round table discussions, at the Milwaukee Vocational School, a feature of previous I.A.A. conventions, will be held on the evening of April 10. After a short forum-demonstration in the school auditorium, the audience will separate into small groups to discuss flame-treating, hard facing, machine cutting, welding of alloy steels, air-acetylene applications, pipe welding, riser cutting, welding of non-ferrous metals and other subjects.

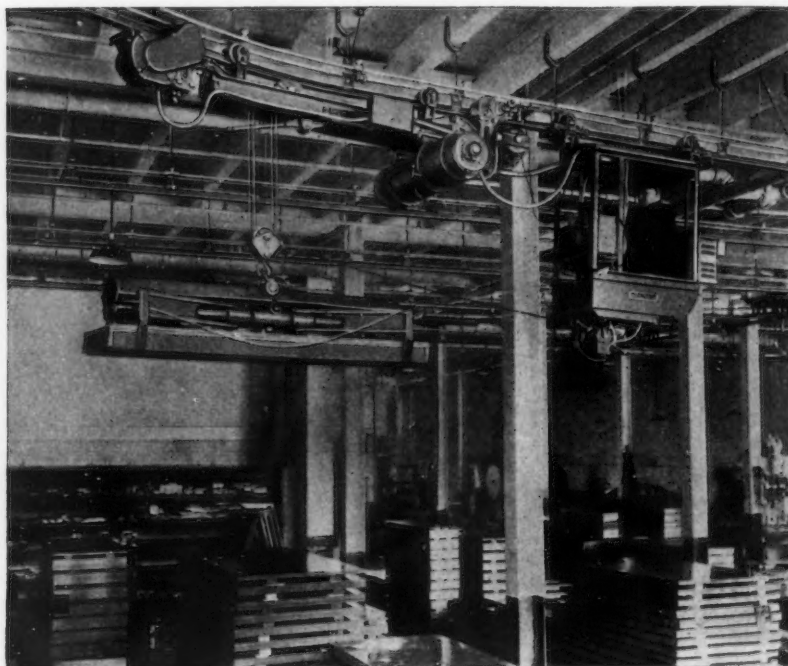
Each group will have as a leader an authority in the subjects discussed.

The panel discussion on oxy-acetylene cutting, with discussions by prominent engineers representing manufacturers and users of machine-cutting equipment, will be held in the Crystal ballroom on the afternoon of April 11.

Two simultaneous sessions are planned for the afternoon of April 12. At, one, foundry and heavy industry applications of the oxy-acetylene process will be discussed, with papers on

flame cleaning, dehydrating and descaling, scarfing and gouging, oxygen lance cutting, and efficiency control in oxy-acetylene cutting. The other session will be devoted to the broad subject of fabrication and production, and will include papers on the welding and brazing of light gage metal, including stainless steel; design and construction of jigs and fixtures for sheet metal welding; welding for enameling; welding of aluminium; and automatic bronze welding.

H. F. Reinhard, 30 East Forty-second Street, New York, is secretary of the International Acetylene Association.



Low headroom carrier with power to climb grades. Sheet grab is motor operated.

## THIS SYSTEM CUTS SHEET-HANDLING COSTS

With a Cleveland Tramrail System sheets can be handled at a sizeable saving over former methods and in addition other advantages may be secured.

Aisle space can be reduced, sheets piled higher and more tonnage stored per square foot of floor area. One operator can manipulate all operations from the cab, including pick-up and delivery.



**CLEVELAND TRAMRAIL DIVISION**  
THE CLEVELAND CRANE & ENGINEERING CO.  
1115 Depot Street      Wickliffe, Ohio

**CLEVELAND TRAMRAIL**  
OVERHEAD MATERIALS HANDLING EQUIPMENT  
Other products: CLEVELAND CRANES and STEELWELD MACHINERY

## Superior Installs New 30-in. Four-High Mill

PITTSBURGH — Superior Steel Corp. is installing a new 30-in. four-high cold mill which is expected to be in operation within the next several weeks, according to Frank R. Frost, president. This latest equipment is in addition to a new 30-in. four-high cold mill and a 30-in. two-high cold mill installed during the latter part of 1938.

According to the company, operations for January have been profitable and a backlog of business has been built up for February and March, particularly in stainless steels. During the past year, stainless steel sales of Superior Steel in dollar volume amounted to more than one-half of the total gross sales.

In submitting the company's report, Mr. Frost pointed out that because of bitter competition in early 1939, the price of all carbon steel rolled products was brought below cost but that losses were curtailed to a considerable degree by increased sales in stainless steel. Net income for 1939 was \$175,192 compared with a net loss of \$291,674 in 1938.

## January Structural Steel Bookings Decline 25%

TONNAGE of fabricated structural steel contracts closed during January was 75,830 tons, approximately 25 per cent below the total of 101,712 tons for January, 1939, while shipments last month were 107,633 tons against 84,281 in the corresponding month of 1939, the American Institute of Steel Construction reports. The institute, which lists tonnage available for future fabrication at 349,695 tons, announces it anticipates that new business in 1940 will not be below 1939.

## Armco Profit \$4,011,908 in '39; Hook Sees Stocks Leveling

AMERICAN ROLLING MILL CO. earned a net profit of \$4,011,908 in 1939, contrasted with a net loss of \$1,307,880 in 1938, and a profit of \$8,231,335 in 1937, Charles R. Hook, president, reports. The company voted a \$1.75 back dividend on preferred, with \$2.21 still in arrears. Fourth quarter profit was \$1,741,964.

"Although the company shipped 61 per cent more tonnage in 1939, the net sales income was only 35 per cent above 1938," Mr. Hook said. "The average prices being received in 1940 are better than those in effect over most of 1939. After a leveling-off of inventories during the first quarter of 1940, we expect an increase in volume at fair prices."

## Can Opener Fails, C-I Men Cut Tin Pot from Child's Head

MARTINS FERRY, OHIO—Tin plate business may be leveling off but the Laughlin plant of Carnegie-Illinois Steel Corp. had a special rush order last week when its craftsmen were called upon to remove a regulation size "pottie" (ask your neighbor who has a child) from the head of a small girl. The girl's mother, residing at Wheeling, W. Va., took her daughter in a street car to Martins Ferry where the difficult operation was performed.

## A. O. Smith Completes Large Oil Cracking Vessel

MILWAUKEE — The largest crude oil cracking vessel ever constructed by A. O. Smith Corp. is ready to be shipped to a southwestern refinery. The pressure vessel is 144 ft. 7¾ in. long with a maximum width of 11 ft. 9¾ in. More than 230,000 lb. of steel plates have been welded in its construction.

## Jackson Refuses Opinion On Lobbying By Labor Board

WASHINGTON—Attorney General Robert H. Jackson has refused to give the special House Committee investigating the NLRB an opinion whether board members and employees have violated a statute prohibiting lobbying by Federal employees. J. Warren Madden, NLRB chairman, had admitted knowledge of pressure being brought by the board on Congress in an attempt to block re-

ductions in NLRB appropriations and Wagner Act changes.

## Labor Contract Must Be in Writing, N. Y. Court Rules

THE Wagner Act requires employers to put into writing any agreement that may be made with employees, the U. S. Circuit Court of Appeals declared this week at New York in a ruling directly opposite to an earlier decision by the Circuit Court

at Chicago in the Inland Steel Co. case.

At New York the court upheld an NLRB order directing the Art Metals Construction Co. to place an agreement with the International Association of Machinists in writing. Judge Learned Hand, in a two-to-one decision, declared, in part, that: "No one can dispute that a permanent memorial of any negotiation which results in a bargain is not only appropriate but practically necessary to its preservation."



Coal Unloading Tower at a Large By-Product Coke Plant. Designed and Built by Heyl & Patterson.

*Specia  
Facilities  
for*

## HANDLING BULK MATERIALS

Unloading of coal is just one of many bulk materials handling operations performed with speed, precision and economy by Heyl & Patterson equipment.

If your problem is the transfer of materials at river, lake or ocean port, the stocking or reclaiming of coal and ore, the disposal of ashes or other waste—any materials handling job requiring special facilities—this organization is equipped to render an unusually comprehensive service.

With a half century of experience, completely coordinated engineering, shop and erection facilities, you can depend upon Heyl & Patterson to find the low-cost, resultful answer to your particular problem.

ORE BRIDGES  
CAR DUMPERS  
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GRAB BUCKETS  
CONVEYORS  
INDUSTRIAL CARS  
CRANES  
SPECIAL TYPES  
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MACHINES  
COAL & COKE  
HANDLING PLANTS

**HEYL & PATTERSON INC.**

50 WATER STREET

PITTSBURGH, PA.

# FABRICATED STEEL

... Lettings drop to 9850 tons from 21,700 tons last week ... New projects lower at 12,600 tons as against 34,700 tons in the previous week ... Plate awards total 5055 tons.

## NORTH ATLANTIC STATES AWARDS

- 4500 Tons, Washington, War Department building, to Bethlehem Steel Co., Bethlehem, Pa.  
750 Tons, New York, apartment house, 56th Street and Lexington Avenue, to Harris Structural Steel Co., Plainfield, N. J.  
500 Tons, Edgewater, N. J., building 3-B and extension to building No. 14 for Alumi-

num Co. of America, to American Bridge Co., Pittsburgh.

- 315 Tons, Pittsburgh, Shadyside Hospital Nurses' Home, to American Bridge Co., Pittsburgh.

- 250 Tons, Lackawanna County, Pa., bridge, route 35055, to American Bridge Co., Pittsburgh.

- 200 Tons, Bridgeport, Conn., housing project, to Bethlehem Steel Co., Bethlehem, Pa.



**CARLINE BRACKET** — Used for connection between side posts and roof carlines in body frame construction of present type trailers.

Buses, trailers, railroad cars, and all transportation units, earn dividends through light weight construction. This is made possible by using high strength, corrosion resistance stampings.

To witness:—These brackets made by Parish are of .050" Ga. and 3/16" High Tensile Steel. They bring sturdy endurance, increased pay-load capacity to trailers.

Parish engineers can bring an added value to your product. Let us show you how.



## PARISH PRESSED STEEL CO.

READING, PENNA.

Pacific Coast Representative  
F. Somers Peterson Co.,  
57 California St.,  
San Francisco, California

**SPRING BRACKET** — For trailer, made of several pressed steel plates welded to form the assembly shown. Lighter and Stronger.



## THE SOUTH

- 105 Tons, New York, 163rd Street and Third Avenue bridges, to Bethlehem Steel Co., Bethlehem, Pa.  
340 Tons, Natchez, Miss., two bridges, to Virginia Bridge Co., Roanoke, Va.  
310 Tons, Richmond, Va., bank building, to Richmond Structural Steel Co., Richmond, Va.  
190 Tons, Abbeville County, S. C., bridge, to Virginia Bridge Co., Roanoke, Va.  
115 Tons, Fredericksburg, Va., Syvania Industrial Corp., boiler house addition, to Belmont Iron Works, Philadelphia.

## CENTRAL STATES

- 145 Tons, Chicago, factory building, to New City Iron Works, Chicago.  
140 Tons, Federal, Ill., flue and fan house for American Smelting & Refining Co., to Mississippi Valley Structural Steel Co., St. Louis.  
130 Tons, Lombard, Ill., bridge section, to American Bridge Co., Pittsburgh.

## WESTERN STATES

- 1260 Tons, Scotia, Cal., Robinson Ferry bridge over Eel River, to Minneapolis-Moline Power Implement Co., Minneapolis, through Engineers, Ltd., San Francisco, contractor.  
595 Tons, Los Angeles, Arroyo Seco undercrossing of Union Pacific and Atchison, Topeka & Santa Fe tracks, to Columbia Steel Co., Los Angeles.

## PENDING STRUCTURAL PROJECTS

### NORTH ATLANTIC STATES

- 2000 Tons, Brooklyn, Fort Hamilton High School; bids March 11.  
1000 Tons, New York, apartment houses on 57th and 58th Streets.  
650 Tons, Oaks, Pa., manufacturing buildings for B. F. Goodrich Co.  
550 Tons, Union Road, Erie County, grade-crossing elimination; bids March 20.  
540 Tons, New York, aeronautics academy, La Guardia Field.  
500 Tons, Monroe County, grade-crossing elimination; bids March 20.  
480 Tons, Philadelphia, structural laboratory for Navy Department; Hughes-Foulkrod Co., Philadelphia, low bidder.  
300 Tons, Glenham, N. Y., engineering and research laboratory buildings for Texas Co.; bids taken Feb. 28.  
275 Tons, Hoffmans, N. Y., New York Central Railroad Co. bridge C-3.  
270 Tons, Flushing, N. Y., warehouse for U. S. Gypsum Co.  
200 Tons, Greenport, N. Y., building for Bluepoints, Inc. (General Foods Corp.).  
170 Tons, New Haven, Conn., plant for Coca-Cola Bottling Co.  
100 Tons, Ridge Road, Erie County, grade-crossing elimination; bids March 20.

### SOUTH AND SOUTHWEST

- 570 Tons, Memphis, Tenn., building for Shelby Paper Box Co.  
300 Tons, Yadkin-Surry Counties, N. C., State highway bridge.  
240 Tons, Douglas, Ariz., converter building extensions for Phelps-Dodge Corp.  
110 Tons, Charleston, W. Va., Montgomery Ward store building for W. B. Geary.

### CENTRAL STATES

- 800 Tons, Flint, Mich., manufacturing building for A.C. Spark Plug Co.  
700 Tons, St. Paul addition to post office; bids March 12.  
400 Tons, Neenah, Wis., addition, Kimberly-Clark Corp.; bids March 1.  
300 Tons, Marion, Ind., State bridge No. 1897.  
300 Tons, Flat Rock, Ind., State bridge No. 1895.  
260 Tons, Ayr, Neb., State bridge.  
130 Tons, Muskingum County, Ohio, State highway project; bids March 1.

### WESTERN STATES

- 700 Tons, Mare Island, Cal., drydock; bids March 6.  
650 Tons, Longview, Wash., viaduct, for Weyerhaeuser Timber Co.  
225 Tons, Montebello, Cal., three oil derricks for Pacific Western Oil Corp., Maybee Oil & Gas Co., and Kern Oil Co., Ltd.  
150 Tons, Long Beach, Cal., two oil derricks for General Petroleum Corp. of California and Dumm Brothers Petroleum Corp.

## FABRICATED PLATES

### AWARDS

- 2500 Tons, Rochester, N. Y., 600 cement cars for Dispatch Shops, Inc., to Carnegie-Illinois Steel Corp., Pittsburgh (tonnage includes shapes).  
985 Tons, New Orleans, four barges for River Terminals Corp., to Nashville Bridge Co., Nashville, Tenn.  
630 Tons, Fort Peck Dam, Mont., tunnel lining, to Chicago Bridge & Iron Co., Chicago.  
500 Tons, Tacoma, Wash., Hooker Chemical



Co. plant, to Steel Tank & Pipe Co. of Oregon, Portland, Ore.

320 Tons, Proving Ground, Ill., welded bomb dunnage units, to F. & W. Machine & Welding Co., Savanna, Ill.

#### PENDING PROJECTS \*

2200 Tons, Los Angeles, replacement siphons for Department of Water and Power (Specifications 3315); bids March 20.

#### SHEET PILING AWARDS

1100 Tons, Chicago, Fullerton Avenue beach protection project, 700 tons to Carnegie-Illinois Steel Corp. and 400 tons to Inland Steel Co., through Great Lakes Dredge & Dry Dock Co., Chicago.

500 Tons, Cleveland, Cut. No. 9A, Cuyahoga River straightening, to Carnegie-Illinois Steel Corp., Pittsburgh, through Western Foundation Co., Chicago.

188 Tons, Racine, Wis., pier extension, to Bethlehem Steel Co., Bethlehem, Pa.

## Steel Ingot Capacity Reduced in 1939

TOTAL capacity of the steel industry for producing steel ingots decreased slightly during 1939 as a result of a substantial reduction in the industry's capacity for producing steel by the Bessemer process, according to the American Iron and Steel Institute. Data on blast furnace capacity at the end of last year are not yet available.

At the close of 1939, the industry's capacity for producing ingots by all processes was rated at 80,950,901 net tons per year. This represents a decline of less than one-half per cent from the rated capacity of 81,238,045 net tons (72,533,969 gross tons) as of Dec. 31, 1938, which was the highest total capacity on record.

Although the industry's capacity for producing both open hearth and electric furnace steel increased somewhat during 1939, these increases were more than offset by a 16 per cent drop in Bessemer steel capacity.

Total capacity of open hearth furnaces at year-end established a new peak of 73,343,547 net tons of ingots, which compares with 72,596,153 net tons as of Dec. 31, 1938.

Electric furnace capacity likewise rose to a new record during the year, increasing from 1,497,658 net tons to 1,592,080 net tons as of Dec. 31, 1939. Capacity of crucible furnaces remained unchanged throughout the year at 5354 net tons of ingots annually.

Reflecting the scrapping last year of more Bessemer converters in the industry, the total annual capacity for producing Bessemer steel at the year-end was 6,009,920 net tons, as against 7,138,880 net tons at the close of 1938.

## This Week on the Assembly Line

(CONCLUDED FROM PAGE 54)

up production last fall. Claims made to the State Commission for benefits have been studied by the State since November. Of the 50,000 employees who claim benefits, 23,000 have been ruled ineligible. However, a decision given last week declared that only the Dodge division employees were directly involved in the strike. The counterclaim is that Dodge is a key

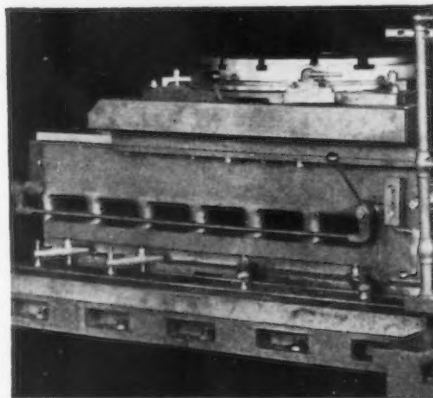
plant feeding parts and sub-assemblies to other plants. Fifteen days have been granted for appeal, which probably will be taken as the result of intervention by the Michigan Manufacturers Association.

In addition to the contention that the payment of unemployment benefits would amount to State financing of strike benefits, it is declared that the award of \$3,000,000 will nearly wipe out the favorable credit balance of the unemployment fund for the last six months of 1939.

# OHIO

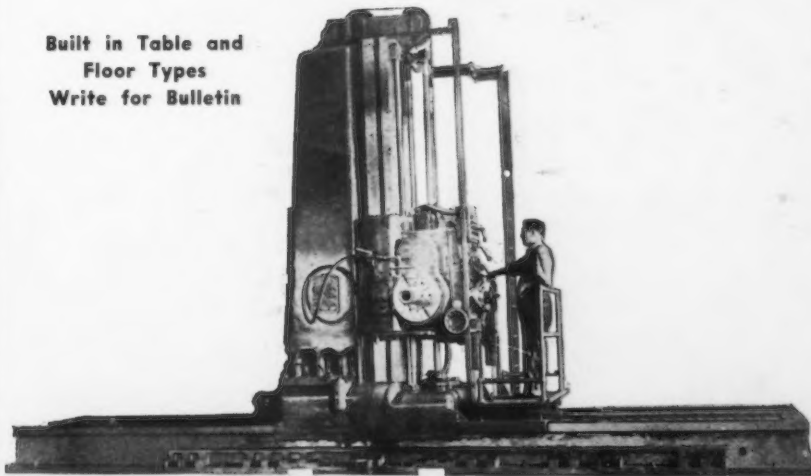
## "DREADNAUGHT" HORIZONTALS—

***Accurate, powerful, convenient machines with all the qualities necessary for modern production requirements.***



Floor type horizontals can be equipped with many types of compound and auxiliary table units—a profitable investment.

**Built in Table and Floor Types  
Write for Bulletin**



## THE OHIO MACHINE TOOL CO.

KENTON, OHIO

MANUFACTURERS OF

**SHAPERS...OHIO DREADNAUGHT...PLANERS  
HORIZONTAL BORING, DRILLING and MILLING MACHINES**

# PERSONALS

P. A. ABE, works manager, Monarch Machine Tool Co., Sidney, Ohio, has been elected vice-president in charge of engineering and production, and J. A. RATERMAN, purchasing agent, has been elected vice-president in charge of purchasing and plant engineering.

Mr. Abe started with the company as a lathe operator in 1915. During his 25 years with Monarch he served as tool maker, tool room foreman, general foreman, superintendent, and works manager.

Mr. Raterman started at Monarch as a machinist in 1917. Since then he has been company salesman, superintendent in charge of assembly, head of the production control department and purchasing agent.

Both Mr. Abe and Mr. Raterman have been directors of the company for three years.

♦ ♦ ♦

HAROLD S. FALK, who has been associated with the Falk Corp., Milwaukee, since 1900 while still at school, has been elected president of the corporation to succeed HERMAN W. FALK, his uncle, and founder of the company, who after 46 years as head of the firm, becomes chairman of the board of directors.

The new president became a permanent employee of the Falk Corp. after completing his general engineering

course at the University of Wisconsin in 1906. As assistant to the superintendent, he worked in various departments from 1906-1920, and in 1921 was appointed vice-president and works manager, positions which he held up to the present.

He is widely known throughout the United States for his work in apprenticeship training. For 10 years he was local chairman of the National Metal Trades Association's apprenticeship committee, receiving an honorary degree from Marquette University for his work in this field in 1930. His accomplishments in industrial training and education led to his appointment to the board of the Milwaukee Vocational School, the largest institution of its kind in the world. He has been president of the board for six years.

Mr. Falk has also been a member of the advisory committee on apprenticeship of the Wisconsin Industrial Commission and the committee on education and training of the American Society of Mechanical Engineers; chairmanship of the committee on education of the National Metal Trades Association; chairman of the apprenticeship training committee of the Steel Founders' Society of America; and a member of the administrative council of the Metal Trades Association for the Milwaukee area.

CHARLES S. BELSTERLING, heretofore vice-president of United States Steel Corp., New York, has been appointed general commerce counsel. He has been identified with the corporation since its organization and is an outstanding figure in the field of interstate commerce law.

♦ ♦ ♦

J. W. EAKINS, who has specialized in motor applications in the marine field for the Reliance Electric & Engineering Co., Cleveland, has been transferred to the Philadelphia office. He will continue to devote a major share of his time to marine work.

GEORGE E. LAW, formerly in the application engineering department of the Reliance company, has been transferred to the company's Chicago office as a sales engineer.

♦ ♦ ♦

HOWARD TERBEEK, former assistant advertising manager of the Pump Engineering Service Corp., Cleveland airplane parts firm, has been appointed advertising manager, effective immediately.

M. J. PHILLIPS, formerly of the Glenn L. Martin Co., Baltimore, has joined the Cleveland company as engineer in charge of hydraulics.

♦ ♦ ♦

ARNOLD LENZ, assistant manufacturing manager of Chevrolet Motor division of General Motors Corp., at Flint, has been elected president of the Manufacturers Association of Flint.

(CONTINUED ON PAGE 95)



**P** A. ABE (left), vice-president in charge of engineering and production, Monarch Machine Tool Co., and J. A. Raterman (right), vice-president in charge of purchasing and plant engineering.



**H**AROLD S. FALK, new president of the Falk Corp.

### Production of Iron and Steel for Sale in 1939

THE report of the American Iron and Steel Institute (AIS10) of finished and semi-finished steel, pig iron, ferromanganese, etc., produced for sale in the fourth quarter and the full year 1939 shows a total production for sale of 34,687,861 gross tons last year. Of this amount, 2,176,-

736 tons was exported and 3,477,883 tons was sold to other members of the industry for further conversion.

Percentage-wise, the products which made the best records in 1939 were cold reduced tin plate, which attained a rate of 88.4 per cent in the year and 107.3 per cent in the fourth quarter;

black plate, which was 78.9 per cent in the year and 102.4 per cent in the fourth quarter; sheets, which were produced at 68.6 per cent in the year and at 95.5 per cent in the fourth quarter; wire, which was 62.3 per cent in the year and 84.2 per cent in the fourth quarter.

AMERICAN IRON AND STEEL INSTITUTE										Fourth Quarter - 1939								
Capacity and Production for Sale of Iron and Steel Products										PRODUCTION FOR SALE—GROSS TONS								
										To Date (12 Months 1939)								
										Current Quarter		Shipments		To Date (12 Months 1939)		Shipments		
										Total	Per cent of capacity	Export	To members of the industry for conversion into further finished products	Total	Per Cent of capacity	Export	To members of the industry for conversion into further finished products	
										Total	Per cent of capacity	Export	To members of the industry for conversion into further finished products	Total	Per Cent of capacity	Export	To members of the industry for conversion into further finished products	
STEEL PRODUCTS	Ingot, blooms, billets, slabs, sheet bars, etc.	32	1	xxxxxxx	1,297,455	xxx	211,961	74.1	74.1	211,961	xxx	211,961	74.1	74.1	211,961	xxx	211,961	
	Heavy structural shapes	8	2	xxxxxxx	4,796,800	68.7	36,668	-	-	36,668	47.4	36,668	-	-	36,668	47.4	36,668	
	Steel piling	4	3	xxxxxxx	309,300	55.3	2,180	-	-	2,180	49.5	2,180	-	-	2,180	49.5	2,180	
	Plates—Sheared and Universal	19	4	xxxxxxx	5,828,310	68.7	49,860	9,631	2,515,274	43.2	49,860	43.2	49,860	9,631	2,515,274	43.2	43.2	
	Skelp	7	5	xxxxxxx	225,254	xxx	49,410	132,227	573,061	xxx	49,410	xxx	49,410	132,227	573,061	xxx	xxx	
	Rails—Standard (over 60 lbs.)	4	6	xxxxxxx	3,395,300	28.4	1,256	-	1,037,489	30.6	1,256	30.6	1,256	-	1,037,489	30.6	30.6	
	Light (60 lbs. and under)	6	7	xxxxxxx	418,500	26.5	3,920	-	79,151	18.9	3,920	18.9	3,920	-	79,151	18.9	18.9	
	All other (Incl. girder, guard, etc.)	2	8	xxxxxxx	105,000	48.7	4,141	-	32,554	31.0	4,141	31.0	4,141	-	32,554	31.0	31.0	
	Splice bar and tie plates	14	9	xxxxxxx	1,290,550	35.7	1,672	-	416,292	32.3	1,672	32.3	1,672	-	416,292	32.3	32.3	
	Bars—Merchant	35	10	xxxxxxx	1,198,115	xxx	27,558	158,169	3,218,519	xxx	27,558	xxx	27,558	158,169	3,218,519	xxx	xxx	
	Concrete reinforcing—New billet	14	11	xxxxxxx	276,155	xxx	40,924	-	927,633	xxx	40,924	xxx	40,924	-	927,633	xxx	xxx	
	Rerolling	19	12	xxxxxxx	41,178	xxx	6,868	-	156,476	xxx	6,868	xxx	6,868	-	156,476	xxx	xxx	
	Cold finished—Carbon	18	13	xxxxxxx	189,375	xxx	1,781	-	529,030	xxx	1,781	xxx	1,781	-	529,030	xxx	xxx	
	Alloy—Hot rolled	15	14	xxxxxxx	243,323	xxx	6,938	21,447	686,768	xxx	6,938	xxx	6,938	21,447	686,768	xxx	xxx	
	Cold finished	14	15	xxxxxxx	20,061	xxx	27	-	59,271	xxx	27	xxx	27	-	59,271	xxx	xxx	
	Hoops and baling bands	5	16	xxxxxxx	19,589	xxx	957	-	64,502	xxx	957	xxx	957	-	64,502	xxx	xxx	
	TOTAL BARS	53	17	xxxxxxx	11,595,470	68.6	85,153	159,616	5,642,199	48.7	85,153	48.7	85,153	159,616	5,642,199	48.7	48.7	
	Tool steel bars (rolled and forged)	15	18	xxxxxxx	94,160	58.0	842	-	40,285	42.8	842	42.8	842	-	40,285	42.8	42.8	
	Pipe and tube—B. W.	15	19	xxxxxxx	1,626,800	70.5	19,904	-	850,870	52.3	19,904	52.3	19,904	-	850,870	52.3	52.3	
	L. W.	11	20	xxxxxxx	1,316,580	51.9	10,025	-	320,463	24.3	10,025	24.3	10,025	-	320,463	24.3	24.3	
	Electric weld	5	21	xxxxxxx	638,400	68.751	8,620	-	238,671	37.4	8,620	37.4	8,620	-	238,671	37.4	37.4	
	Seamless	2	22	xxxxxxx	2,968,900	52.4	47,208	-	1,505,951	50.7	47,208	50.7	47,208	-	1,505,951	50.7	50.7	
	Conduit	7	23	xxxxxxx	165,670	53.9	826	-	70,402	42.5	826	42.5	826	-	70,402	42.5	42.5	
	Mechanical Tubing	6	24	xxxxxxx	265,600	75.2	2,727	-	143,627	44.1	2,727	44.1	2,727	-	143,627	44.1	44.1	
	Wire rods	19	25	xxxxxxx	254,683	xxx	15,513	67,724	706,571	xxx	15,513	xxx	15,513	67,724	706,571	xxx	xxx	
	Wire—Drawn	38	26	xxxxxxx	1,970,195	84.2	24,666	9,347	1,228,087	62.3	24,666	62.3	24,666	9,347	1,228,087	62.3	62.3	
	Nails and staples	19	27	xxxxxxx	1,080,760	65.4	15,827	-	606,059	56.1	15,827	56.1	15,827	-	606,059	56.1	56.1	
	Barbed and twisted	16	28	xxxxxxx	428,075	56.4	12,627	-	206,269	48.2	12,627	48.2	12,627	-	206,269	48.2	48.2	
	Woven wire fence	15	29	xxxxxxx	695,330	55.4	434	-	244,282	35.1	434	35.1	434	-	244,282	35.1	35.1	
	Bale ties	11	30	xxxxxxx	110,680	41.9	25	-	53,167	48.0	25	48.0	25	-	53,167	48.0	48.0	
All other wire products	5	31	xxxxxxx	24,580	29.5	-	-	5,148	21.1	-	21.1	-	-	5,148	21.1	21.1		
Fence posts	12	32	xxxxxxx	151,700	48.7	158	-	53,963	41.0	158	41.0	158	-	53,963	41.0	41.0		
Black plate	12	33	xxxxxxx	462,815	102.4	2,531	41,387	365,169	78.9	2,531	78.9	2,531	41,387	365,169	78.9	78.9		
Tin plate—Hot rolled	10	34	xxxxxxx	1,327,360	53.0	61,250	-	576,162	37.7	61,250	37.7	61,250	-	576,162	37.7	37.7		
Cold reduced	10	35	xxxxxxx	1,936,200	107.3	89,502	-	1,710,848	88.4	89,502	88.4	89,502	-	1,710,848	88.4	88.4		
Sheets—Hot rolled	26	36	xxxxxxx	1,568,654	xxx	60,505	86,833	4,343,727	xxx	60,505	xxx	60,505	86,833	4,343,727	xxx	xxx		
Galvanized	16	37	xxxxxxx	379,829	xxx	34,816	-	1,245,466	xxx	34,816	xxx	34,816	-	1,245,466	xxx	xxx		
Cold rolled	18	38	xxxxxxx	630,869	xxx	15,200	-	1,805,231	xxx	15,200	xxx	15,200	-	1,805,231	xxx	xxx		
All other	16	39	xxxxxxx	136,877	xxx	4,353	-	405,153	xxx	4,353	xxx	4,353	-	405,153	xxx	xxx		
TOTAL SHEETS	27	40	xxxxxxx	11,374,065	95.5	114,874	86,833	7,799,577	68.6	114,874	68.6	114,874	86,833	7,799,577	68.6	68.6		
Strip—Hot rolled	24	41	xxxxxxx	3,137,300	59.3	16,399	62,524	1,207,906	38.5	16,399	38.5	16,399	62,524	1,207,906	38.5	38.5		
Cold rolled	36	42	xxxxxxx	1,156,910	76.4	4,140	-	603,926	52.2	4,140	52.2	4,140	-	603,926	52.2	52.2		
Wheels (car, rolled steel)	5	43	xxxxxxx	380,320	59.9	957	-	134,598	35.4	957	35.4	957	-	134,598	35.4	35.4		
Axles	5	44	xxxxxxx	425,900	31.6	2,053	-	66,045	15.5	2,053	15.5	2,053	-	66,045	15.5	15.5		
Track spikes	11	45	xxxxxxx	300,100	44.1	875	-	106,892	35.6	875	35.6	875	-	106,892	35.6	35.6		
All other	4	46	xxxxxxx	9,450	133.4	-	-	8,682	91.9	-	91.9	-	-	8,682	91.9	91.9		
TOTAL STEEL PRODUCTS	136	47	xxxxxxx	12,107,205	xxx	905,166	1,311,047	54,687,861	xxx	905,166	xxx	905,166	1,311,047	54,687,861	xxx	xxx		
Estimated total steel finishing capacity based on a yield from ingots of 70.0%										-	48	48,514,000	xxx	89.0	xxx	xxx	64.3	xxx
IRON PRODUCTS	Pig iron, ferro manganese and spiegel	28	49	xxxxxxx	1,566,570	xxx	60,346	675,119	4,233,788	xxx	60,346	xxx	60,346	675,119	4,233,788	xxx	xxx	
	Ingot moulds	4	50	xxxxxxx	152,953	xxx	904	-	361,616	xxx	904	xxx	904	-	361,616	xxx	xxx	
	Bars	9	51	xxxxxxx	147,200	35.9	16	718	54,123	23.2	16	23.2	16	718	54,123	23.2	23.2	
	Pipe and tubes	3	52	xxxxxxx	97,730	45.0	218	-	40,640	41.6	218	41.6	218	-	40,640	41.6	41.6	
	All other	2	53	xxxxxxx	65,560	25.2	807	1,680	13,873	21.8	807	21.8	807	1,680	13,873	21.8	21.8	
	TOTAL IRON PRODUCTS (ITEMS 51 to 53)	11	54	xxxxxxx	250,530	45.1	1,041	2,398	88,636	35.4	1,041	35.4	1,041	2,398	88,636	35.4	35.4	

Total number of companies  
included --- 157

Total steel products produced for sale, less shipments to members of the industry for conversion into further finished products Current quarter 10,796,358 G.T.; 89.0 % of Finishing Capacity.  
To date 31,209,978 G.T.; 64.3 % of Finishing Capacity.

The above tonnages represent 70.0 % of the ingots produced by companies whose products are included above.



# ... THE NEWS IN BRIEF ...

**Automobile industry** heads toward spring upturn as assemblies make unexpected gain and sales continue to increase.—Page 52.

**Buick division** of General Motors announces plant expansion program including new axle plant.—Page 54.

**Abolition of NLRB, Wagner Act** revision planned in present session of Congress.—Page 56.

**Campaign against trade associations** considered unlikely despite efforts of Thurman Arnold, assistant attorney general.—Page 58.

**Sierra Iron Co.**, new West Coast organization, to be headed by D. H. Botchford, Los Angeles; capacity of 100 tons daily planned by 1941.—Page 60.

**Government manganese ore difficulties** blamed on tariff.—Page 60.

**White House observations** reported to have delayed further consideration of Smith scrap licensing bill.—Page 60.

**Division of Public Contracts** reports iron and steel purchases of \$1,135,309 in week ended Feb. 17.—Page 62.

**ICC cancels motor truck schedule** on steel products between Pittsburgh and Baltimore.—Page 64.

**\$1,088,330 generator contract** to Westinghouse Electric & Mfg. Co.—Page 65.

**E. T. Weir**, president, American Iron and Steel Institute, is appointed chairman of G.O.P. national finance committee.—Page 65.

**Annual spring conference** of Association of Iron and Steel Engineers, April 1-2, expected to draw 1000.—Page 65.

**Canadian industrial activity** being stimulated by growing volume of war orders.—Page 66.

**Tests of personnel**, as of material, suggested to Detroit industry by Dr. Harry J. Baker.—Page 68.

**Britain** will need more imported scrap.—Page 68.

**International Acetylene Association** completes program for three-day meeting at Milwaukee.—Page 69.

**Aircraft orders** totaling \$1,000,000,000 to be placed in U. S. by French and British.—Page 69.

**Wellman Engineering Co.** reports \$934,000 backlog at close of 1939.—Page 69.

**Superior Steel Corp.** is installing new 30-in. four high cold mill to operate in several weeks.—Page 70.

**Fabricated structural steel contracts** in January off 25 per cent to 78,830 tons from like month of 1939.—Page 70.

**Employers are required**, under Wagner Act, to put agreements with employees in writing, U. S. court rules at New York.—Page 71.

**Attorney General Jackson** refuses to give opinion on possible violation of lobbying statute by NLRB.—Page 71.

**A. O. Smith Corp.** ships 144-ft. oil cracking vessel, largest made in its plants, to Southwest.—Page 71.

**American Rolling Mill Co.** reports 1939 profit of \$4,011,908 against 1938 loss of \$1,307,880.—Page 71.

**Steel ingot capacity** in the U. S. declined slightly in 1939, according to the American Iron and Steel Institute.—Page 73.

**Bridgeport Tool Engineers Association** to hold tool and equipment exhibition, March 6-9, at state armory, Bridgeport.—Page 87.

**Central Tube Co.**, Pittsburgh, liquidates its business; Spang Chalfant to service its pipe stock accounts.—Page 95.

**McKeesport Tin Plate Co.** plant is closed by SWOC dues collectors.—Page 96.

**Supreme Court upholds** validity of Steckel patents assigned to Cold Metal Process Co.—Page 96.

**Airplane industry's machine tool requirements** and continuance of foreign buying hold volume of orders at fairly high level. Milwaukee Road issues inquiry for 25 tools.—Page 98.

**American Rolling Mill Co.** plans \$120,000 addition to general office building.—Page 102.

**New developments** in molded plastics discussed at Bakelite meeting in Philadelphia.—Page 102.

**General Motors Corp.** division to build large spark plug plant, covering four acres, at Flint, Mich.—Page 102.

## SECTIONS INDEX

Obituary .....	68
Personals .....	74
Steel Ingot Production .....	81
Summary of the Week .....	82
Comparison of Prices .....	83
Markets .....	84
Fabricated Steel .....	72
Non-ferrous Market .....	89
Scrap Market and Prices .....	90
Finished Iron & Steel .....	92
Pig Iron & Raw Material Prices ..	94
Plant Expansion & Equipment ...	98
Machine Tool Activity .....	102

## MEETINGS

March 7 and 8—Grinding Wheel Manufacturers Association and Abrasive Grain Association, Southern Pines, N. C.

March 7 to 9—American Society of Tool Engineers, annual meeting, New York.

March 14 and 15—Society of Automotive Engineers, national aeronautic meeting, Washington.

April 10 to 12—International Acetylene Association, annual convention, Milwaukee.

April 11 and 12—Galvanizers Committee of American Zinc Institute, annual spring meeting, Pittsburgh.

May 6 to 10—American Foundrymen's Association, annual meeting and equipment exhibition, Chicago.

May 20 to 22—American Gear Manufacturers Association, annual meeting, Asheville, N. C.

May 23—American Iron and Steel Institute, annual meeting, New York.



Truck Body built of "A.W." Dyn-el for C. P. Maiden by Barry & Baily Co., Phila. Over-all length, 260". Over-all width, 96". Over-all height, 98".

**Increases Payload 1500 Pounds . . .** A conventional truck body of this type and size weighs 5000 pounds. Built of "A.W." Dyn-el high strength steel, it weighs only 3500 pounds. The Dyn-el body is stronger, longer lasting, more resistant to shock, fatigue and corrosion. And the truck, itself, is less expensive to operate because of the decreased weight . . . *Fewer pounds of steel to buy means fewer pounds of steel to move.* Build light and strong with "A.W." Dyn-el high strength steel.

*The 48-page book, "A.W." Presents Dyn-el, gives full details of savings in weight and cost possible with this new high-strength, flat-rolled steel. Write for a copy.*

## **ALAN WOOD STEEL COMPANY**

MAIN OFFICE AND MILLS, CONSHOHOCKEN, PENNA. : : SINCE 1826 : : DISTRICT OFFICES AND REPRESENTATIVES—Philadelphia, New York, Boston, Atlanta, Buffalo, Chicago, Cincinnati, Cleveland, Denver, Detroit, Houston, New Orleans, St. Paul, Pittsburgh, Roanoke, Sanford, N. C., St. Louis, Los Angeles, San Francisco, Seattle, Montreal—A. C. Leslie & Co. PRODUCTS INCLUDE—Steel Products in Carbon, Copper or Alloy Analyses : : Sheared Steel Plates : : Hot Rolled Sheets and Strip : : "A.W." Rolled Steel Floor Plates : : Billets, Blooms and Slabs : : "Swede" Pig Iron : : Reading Cut Nails.

# ◆ ◆ ◆ NATION HONORS ITS

**T**HE 150th anniversary of the founding of the American patent system was marked this week by the awarding of 19 National Modern Pioneer plaques to a group of outstanding in-

ventors and scientists selected from among 500 men previously honored at various regional dinners. Acknowledgment of the achievements of the National Modern Pioneers



**DR. EDWIN H. ARMSTRONG**

... professor of electrical engineering, Columbia University, whose invention of the superheterodyne radio receiver and work on vacuum tubes and the super-regenerative circuit have played important roles in the development of the radio industry.



**DR. LEO H. BAEKELAND**

... founder of the Bakelite Corp. and father of the modern plastic industry. His studies of photographic paper and electrolytic cells have brought world-wide recognition.



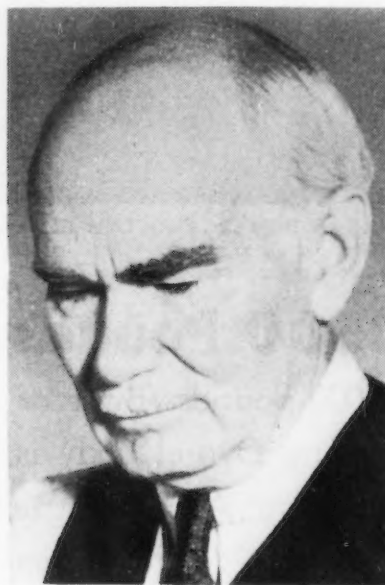
**DR. WILLIAM M. BURTON**

... formerly president of Standard Oil Co. of Indiana, was a pioneer in petroleum cracking and made important contributions toward the fuller utilization of the nation's limited petroleum supply.



**DR. GEORGE O. CURME, JR.**

... vice-president of Carbide & Carbon Chemicals Corp., the father of synthetic aliphatic organic chemistry, is noted for his numerous inventions and discoveries in connection with hydro-carbon compounds.



**DR. LEE DE FOREST**

... a pioneer in the development of wireless telegraphy in America and holder of 300 inventions which have formed the basis of many modern devices essential to the radio, long distance telephone, telegraph, television and sound picture industries.



**JOHN V. DORR**

... president of Dorr Co., Inc., whose inventions and discoveries have been important contributions to the perfection of methods of recovering gold and other metals from low grade ores. Is also noted for his work on sewage treatment.



# MODERN PIONEERS ♦ ♦ ♦

took place Tuesday at the Waldorf-Astoria Hotel, New York, and was broadcast over a nation-wide hook-up. The honoring of modern industrial pioneers was sponsored by

the National Association of Manufacturers, through an independent committee headed by Dr. Karl T. Compton, president of Massachusetts Institute of Technology.



**WILLIS H. CARRIER**

... chairman of the board, Carrier Corp., whose pioneering in the field of air conditioning was an important factor in the development of modern air conditioning of homes, offices and factory buildings.



**DR. WILLIAM D. COOLIDGE**

... director of research laboratory, General Electric Co., has made many noteworthy contributions to the present-day knowledge of physical chemistry. His outstanding inventions are ductile tungsten and an improved X-ray tube.



**DR. FREDERICK G. COTTRELL**

... a pioneer in the purification of blast furnace fumes and the recovery of products precipitated from the gases and a co-founder of the Research Corporation.



**HENRY FORD**

... founder of the Ford Motor Co. and father of the modern automobile industry. Widespread adoption of principles first put into effect by Ford has led to lower prices, higher wages and wider distribution of the products of American industry.



**CHARLES F. KETTERING**

... vice-president of General Motors Corp., epitomizes the spirit of modern American industrial pioneering. Is the inventor of numerous devices for electric starting of automobiles, refrigeration, machinery and equipment for farm lighting.



**EDWIN H. LAND**

... president of Polaroid Corp. who transformed polarized light from a scientists' plaything into practical use in home and industry and made possible economical and efficient anti-glare applications.



DR. IRVING LANGMUIR

... associate director, research laboratory, General Electric Co., is the inventor of the gas filled electric lamp and a pioneer in many branches of electrical engineering.



DR. HARRY STEENBOCK

... professor of biochemistry, University of Wisconsin, is the originator of the process of irradiating foods which has led to the production of vitamin D milk and bread, irradiated ergosterol and other anti-rachitic foods and drugs.



JOHN B. TYTUS

... vice-president of American Rolling Mill Co., is largely responsible for bringing the cold rolling of steel to its present high state of efficiency. His efforts made steel adaptable to countless new uses and increased employment in the metal working industry by thousands and payrolls by billions of dollars.



CHARLES F. WALLACE

... vice-president of Wallace & Tiernan Co., Inc., is a pioneer in the perfection of the chlorine treatment of drinking water and other similar developments.



ORVILLE WRIGHT

... who, with his brother Wilbur, was the first to successfully fly a heavier-than-air machine. He is also the inventor of numerous devices essential to modern aviation.



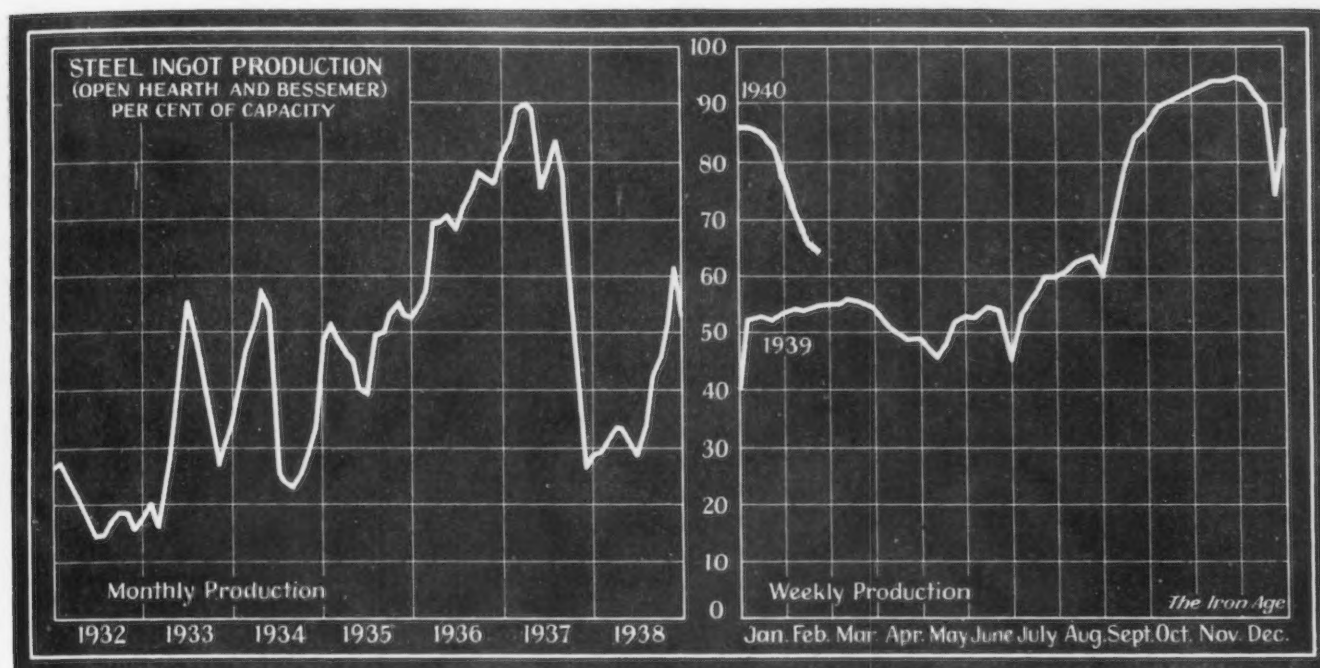
DR. VLADIMIR K. ZWORYKIN

... director, Electronic Research Division, RCA Mfg. Co., is the inventor of the iconoscope, or television eye, the heart of picture and television transmission.

IN addition to the 18 national Modern Pioneer award winners shown on these pages, a joint award was made to 11 men of the E. I. duPont de Nemours Co., as inventors of Nylon, a synthetic fabric designed to take the place of silk. The men included in this joint

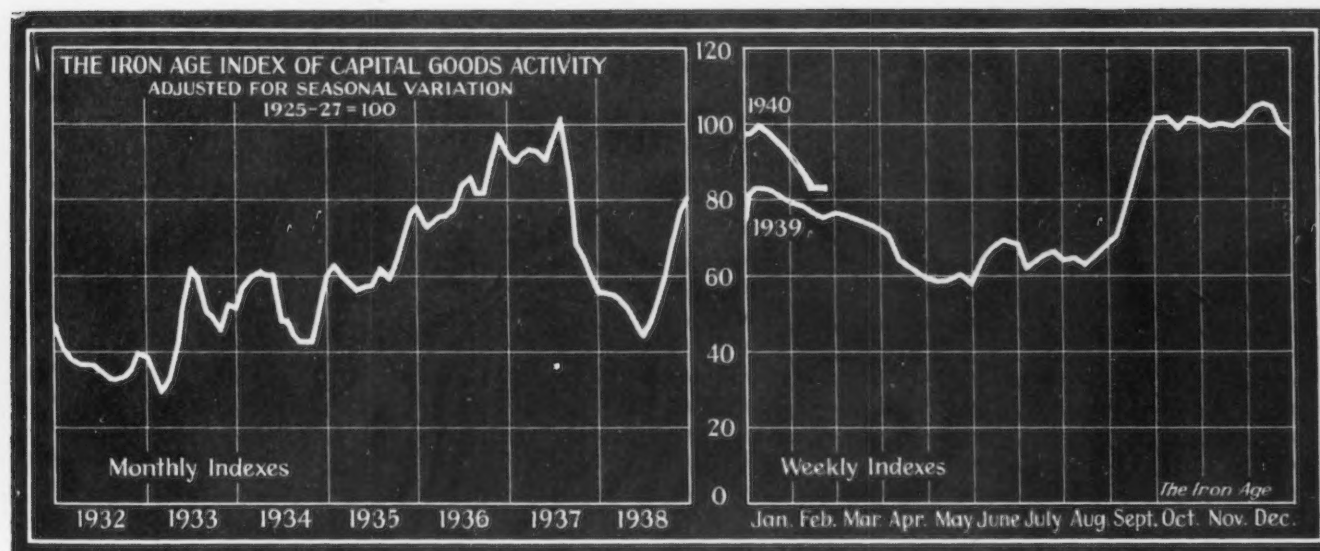
award are: Wallace H. Carothers (deceased), Willard E. Catlin, Donald D. Coffman, Winfield W. Heckert, Benjamin W. Howk, George D. Graves, Wilbur A. Lazier, John B. Miles, Jr., Wesley R. Peterson, Frank K. Signaigo and Edgar W. Spanagel.

# Ingot Rate Declines Two Points to 65% of Capacity



District Ingot Production, Per Cent of Capacity		Pitts- burgh	Chicago	Valleys	Phila- delphia	Cleve- land	Buffalo	Wheel- ing	Detroit	Southern	S. Ohio	Western	St. Louis	East- ern	Aggre- gate
CURRENT WEEK...		64.0	59.0	44.0	65.0	68.0	61.5	88.0	95.0	88.0	57.5	80.0	61.5	50.0	65.0
PREVIOUS WEEK...		64.0	63.5	45.0	69.0	66.0	72.0	88.0	90.0	88.0	61.5	80.0	61.5	70.0	67.0

## Decline of Capital Goods Index Halted



THE decline in output of the heavy goods industries over the past five weeks, as measured by THE IRON AGE capital goods index, was halted, at least temporarily, in the past week. At the close of the week the index stood at 83, as compared with 82.4 in the preceding week. This leveling off of the index occurred after five consecutive weekly decreases from the present year's peak of 100 reached in the second week of January. The present position of the index is comparable to its position in mid-September, 1938, when the index was being driven upward by the sharp gain in industrial operations following Great Britain's declaration of war. The chief stabilizing influence of the past week was the automobile series and, to a lesser degree, the lumber carloadings factor. All the other

components of the index continued to decline, including the steel series.

	Week Ended Feb. 24	Week Ended Feb. 17	Comparable Week	
			1939	1929
Steel ingot production <sup>1</sup> .....	88.7	91.0	74.2	117.0
Automobile production <sup>2</sup> .....	108.6	100.5	79.9	129.1
Construction contracts <sup>3</sup> .....	65.3	65.6	104.4	132.7
Forest products carloadings <sup>4</sup> .....	57.0	55.6	44.9	116.9
Production and shipments, Pittsburgh District <sup>5</sup> .....	95.4	99.2	71.9	116.3
Combined index .....	83.0	82.4	75.1	122.4

Sources: <sup>1</sup> THE IRON AGE; <sup>2</sup> Ward's Automotive Reports; <sup>3</sup> Engineering News-Record; <sup>4</sup> Association of American Railroads; <sup>5</sup> University of Pittsburgh. The indexes of forest products carloadings and activity in the Pittsburgh area reflect conditions as of the week ending Feb. 17. Other indexes cover the week of Feb. 24.



# ... SUMMARY OF THE WEEK ...

... *Steel buying improves slightly, but production declines further.*

o o o

... *Export sales one of the encouraging features of current situation.*

o o o

... *Steel scrap composite drop halts at previous week's level.*

A NOTICEABLE change for the better in the volume of new steel orders has occurred within the past few days. While the improvement is neither broad enough nor large enough to be conclusive evidence of a general reversal of the downward trend of the past two or three months, it is, at any rate, the first sign that the decline in new buying and in production may have been halted.

Taken in conjunction with other factors, such as the upward trend in automobile manufacturing, an increasingly good export trade, the approach of spring, the stability of the steel price structure, and the fact that THE IRON AGE steel scrap composite price is unchanged for the first time since mid-January, the betterment in order volume, slight though it is, may be of more significance than can at present be established.

Inquiries for steel from domestic consumers have also appeared in larger numbers, indicating, perhaps, the working down of inventories, though some buyers are suspected of "feeling out" the market to determine the strength of prices. Reports of price concessions on sheets, when run down, have come about, it appears, from the \$2 a ton concessions quite generally offered by hand mills on hot rolled pickled sheets in 19 to 22 gages, which have not affected the general price structure.

Current export sales and prospects for further expansion are attracting more attention within the industry than the domestic situation. With some companies February export totals will exceed those of any month since September, when the outbreak of war caused a rush of foreign buyers to this market. Notwithstanding the difficulty of doing business with some countries owing to exchange restrictions and other artificial barriers, the total volume from all world sources is encouraging. The growing volume

of war orders being placed in Canada, together with the normal non-war requirements, has filled up Dominion mills for some months, causing a larger overflow of steel orders into the United States. Orders for shell rounds have come to some mills on this side of the border.

AMONG important steel-using industries, the automobile industry is outstandingly the most active. The jump in assemblies to more than 100,000 a week is well above the production attained in corresponding weeks of 1938 and 1939. Current high output and healthy sales volume presage large production in March.

Railroad equipment demand, more or less dormant since the heavy buying of last fall, has sprung to life in a moderate way. The Western Association of Railway Executives has received bids on a large number of freight cars of standard design, to be purchased in 500-car lots. At least eight roads are interested in this pool purchase plan. The New York Central is taking bids on 1000 freight cars for the Pittsburgh & Lake Erie and 25 heavy freight locomotives and probably will build 500 cement cars in its Rochester, N. Y., shops.

Tin plate production, down to 55 per cent this week, does not yet reflect the increased can manufacturing activity usually started at about this time of year, but improvement in mill schedules is expected within a short period.

After a fairly good showing a week ago, building construction, as represented by fabricated structural steel and reinforcing bar orders and inquiries, is in a slump this week. Despite the small amount of such business placed in January and February, the American Institute of Steel Construction predicts that the total volume in 1940 will not be less than that of 1939.

The Navy Department is taking bids until March 12 on 11,415 tons of plates, shapes, bars, sheets and strip for nine years.

THE rate of steel ingot production this week is estimated at 65 per cent, down two points from last week. Whether new business will increase in sufficient volume to forestall a further decline remains to be seen, but in any event steel companies believe there is a sufficient potential volume of requirements to sustain production at 60 per cent or better at least through March.

# A Comparison of Prices

Market Prices at Date, and One Week, One Month, and One Year Previous  
Advances Over Past Week in Heavy Type, Declines in Italics

## Rails and Semi-finished Steel

Per Gross Ton:	Feb. 27, 1940	Feb. 20, 1940	Jan. 30, 1940	Feb. 28, 1939
Rails, heavy, at mill	\$40.00	\$40.00	\$40.00	\$40.00
Light rails: Pittsburgh, Chicago, Birmingham	40.00	40.00	40.00	40.00
Rerolling billets: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point	34.00	34.00	34.00	34.00
Sheet bars: Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point	34.00	34.00	34.00	34.00
Slabs: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point	34.00	34.00	34.00	34.00
Forging billets: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham	40.00	40.00	40.00	40.00
Wire rods: Nos. 5 to 9/32 in., Pittsburgh, Chicago, Cleveland, cents per lb.	2.00	2.00	2.00	1.92
Skelp, grvd. steel: Pittsburgh, Chicago, Youngstown, Coatesville, Sparrows Point, cents per lb.	1.90	1.90	1.90	1.90

Cents Per Lb.:	Feb. 27, 1940	Feb. 20, 1940	Jan. 30, 1940	Feb. 28, 1939
Wire nails: Pittsburgh, Chicago, Cleveland, Birmingham	\$2.55	\$2.55	\$2.55	\$2.45
Plain wire: Pittsburgh, Chicago, Cleveland, Birmingham	2.60	2.60	2.60	2.60
Tin plate, 100 lb. base box: Pittsburgh and Gary	5.00	5.00	5.00	5.00

## Pig Iron

Per Gross Ton:	Feb. 27, 1940	Feb. 20, 1940	Jan. 30, 1940	Feb. 28, 1939
No. 2 fdy., Philadelphia	\$24.84	\$24.84	\$24.84	\$22.84
No. 2, Valley furnace	23.00	23.00	23.00	21.00
No. 2, Southern Cin'ti	23.06	23.06	23.06	21.06
No. 2, Birmingham	19.38	19.38	19.38	17.38
No. 2, foundry, Chicago†	23.00	23.00	23.00	21.00
Basic, del'd eastern Pa.	24.34	24.34	24.34	22.34
Basic, Valley furnace	22.50	22.50	22.50	20.50
Malleable, Chicago†	23.00	23.00	23.00	21.00
Malleable, Valley	23.00	23.00	23.00	21.00
L. S. charcoal, Chicago	30.34	30.34	30.34	28.34
Ferromanganese, seab'd carlots	100.00	100.00	100.00	80.00

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

## Finished Steel

Cents Per Lb.:	Feb. 27, 1940	Feb. 20, 1940	Jan. 30, 1940	Feb. 28, 1939
Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham	2.15	2.15	2.15	2.25
Plates: Pittsburgh, Chicago, Gary, Birmingham, Sparrows Point, Cleveland, Youngstown, Coatesville, Claymont	2.10	2.10	2.10	2.10
Structural shapes: Pittsburgh, Chicago, Gary, Buffalo, Bethlehem, Birmingham	2.10	2.10	2.10	2.10
Alloy bars: Pittsburgh, Buffalo, Bethlehem, Massillon or Canton	2.70	2.70	2.70	2.80
Cold finished bars: Pittsburgh, Buffalo, Cleveland, Chicago, Gary	2.65	2.65	2.65	2.70
Hot rolled strip: Pittsburgh, Chicago, Gary, Cleveland, Middletown, Youngstown, Birmingham	2.10	2.10	2.10	2.15
Cold rolled strip: Pittsburgh, Cleveland, Youngstown	2.80	2.80	2.80	2.95
Sheets, galv., No. 24: Pittsburgh, Gary, Sparrows Point, Buffalo, Middletown, Youngstown, Birmingham	3.50	3.50	3.50	3.50
Hot rolled sheets: Pittsburgh, Gary, Birmingham, Buffalo, Sparrows Point, Cleveland, Youngstown, Middletown	2.10	2.10	2.10	2.15
Cold rolled sheets: Pittsburgh, Gary, Buffalo, Youngstown, Cleveland, Middletown	3.05	3.05	3.05	3.20

## Scrap

Per Gross Ton:	Feb. 27, 1940	Feb. 20, 1940	Jan. 30, 1940	Feb. 28, 1939
Heavy melting steel, P'gh	\$17.25	\$17.25	\$18.25	\$15.75
Heavy melting steel, Phila.	17.25	17.25	17.50	15.25
Heavy melting steel, Ch'go.	15.625	15.625	16.25	14.25
Carwheels, Chicago	17.25	17.25	16.75	12.50
Carwheels, Philadelphia	20.25	20.25	20.25	16.75
No. 1 cast, Pittsburgh	18.25	18.25	18.75	15.50
No. 1 cast, Philadelphia	20.25	20.25	20.25	16.75
No. 1 cast, Ch'go (net ton)	14.25	14.25	14.25	12.75

## Coke, Connellsville

Per Net Ton at Oven:	Feb. 27, 1940	Feb. 20, 1940	Jan. 30, 1940	Feb. 28, 1939
Furnace coke, prompt	\$4.00	\$4.00	\$4.00	\$3.75
Foundry coke, prompt	5.25	5.25	5.50	4.75

## Non-Ferrous Metals

Cents per Lb. to Large Buyers:	Feb. 27, 1940	Feb. 20, 1940	Jan. 30, 1940	Feb. 28, 1939
Copper, Electrolytic, Conn.	11.50	11.50	11.625	11.25
Copper, Lake, New York	11.50	11.50	12.00	11.375
Tin (Straits), New York	48.50	46.00	45.875	46.00
Zinc, East St. Louis	5.75	5.50	5.50	4.50
Zinc, New York	6.14	5.89	5.89	4.89
Lead, St. Louis	5.00	5.00	5.10	4.60
Lead, New York	4.85	4.85	5.25	4.75
Antimony (Asiatic), N. Y.	16.50	16.50	16.50	14.00

On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

# The Iron Age Composite Prices

## Finished Steel

	Feb. 27, 1940	One week ago	One month ago	One year ago
	2.261c. a Lb.	2.261	2.261	2.286
Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strip. These products represent 85 per cent of the United States output.				
	High	Low		
1940.....	2.286c., Jan. 3	2.236c., May 16		
1939.....	2.512c., May 17	2.211c., Oct. 18		
1938.....	2.512c., Mar. 9	2.249c., Jan. 4		
1937.....	2.249c., Dec. 28	2.016c., Mar. 10		
1936.....	2.062c., Oct. 1	2.056c., Jan. 8		
1935.....	2.118c., Apr. 24	1.945c., Jan. 2		
1934.....	1.953c., Oct. 3	1.792c., May 2		
1933.....	1.915c., Sept. 6	1.870c., Mar. 15		
1932.....	1.981c., Jan. 13	1.833c., Dec. 29		
1931.....	2.192c., Jan. 7	1.962c., Dec. 9		
1930.....	2.236c., May 28	2.192c., Oct. 29		
1929.....				

## Pig Iron

	Feb. 27, 1940	One week ago	One month ago	One year ago
	\$22.61 a Gross Ton	22.61	22.61	20.61
Based on average for basic iron at Valley furnace and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.				
	High	Low		
1940.....	\$22.61, Sept. 19	\$20.61, Sept. 12		
1939.....	23.25, June 21	19.61, July 6		
1938.....	23.25, Mar. 9	20.25, Feb. 16		
1937.....	19.73, Nov. 24	18.73, Aug. 11		
1936.....	18.84, Nov. 5	17.83, May 14		
1935.....	17.90, May 1	16.90, Jan. 27		
1934.....	16.90, Dec. 5	13.56, Jan. 3		
1933.....	14.81, Jan. 5	13.56, Dec. 6		
1932.....	15.90, Jan. 6	14.79, Dec. 15		
1931.....	18.21, Jan. 7	15.90, Dec. 16		
1930.....	18.71, May 14	18.21, Dec. 17		
1929.....				

## Steel Scrap

	Feb. 27, 1940	One week ago	One month ago	One year ago
	\$16.71 a Gross Ton	16.71	17.33	15.08
Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.				
	High	Low		
1940.....	\$17.67, Jan. 2	\$16.71, Feb. 20		
1939.....	22.50, Oct. 3	14.08, May 16		
1938.....	15.00, Nov. 22	11.00, June 7		
1937.....	21.92, Mar. 30	12.92, Nov. 10		
1936.....	17.75, Dec. 21	12.67, June 9		
1935.....	13.42, Dec. 10	10.33, Apr. 29		
1934.....	13.00, Mar. 13	9.50, Sept. 25		
1933.....	12.25, Aug. 8	6.75, Jan. 3		
1932.....	8.50, Jan. 12	6.43, July 5		
1931.....	11.33, Jan. 6	8.50, Dec. 29		
1930.....	15.00, Feb. 18	11.25, Dec. 9		
1929.....	17.58, Jan. 29	14.08, Dec. 3		

# ... THIS WEEK'S MARKET NEWS ...

## STEEL OPERATIONS

*... Rate for industry is two points lower at 65%*

THE IRON AGE estimate of ingot production for the current week is 65 per cent, down two points from last week. However, there are scattered indications that the decline may have reached bottom or close to it for the present.

Although the CHICAGO rate has declined four and a half points to 59 per cent, the PITTSBURGH rate has gone no lower, remaining at 64 per cent. In the CLEVELAND-LORAIN district there has been a gain of two points to 68 per cent and a gain of three points to 95 per cent has occurred in DETROIT. The sharpest drop has occurred in the BUFFALO district, which is down from 70 per cent last week to 61½ per cent this week. The EASTERN PENNSYLVANIA district is four points lower at 65 per cent. The lowest point in the country is the 44 per cent rate in the YOUNGSTOWN area.

Blast furnace activity has been declining along with steel, a number of furnaces having gone out this month.

## NEW BUSINESS

*... Domestic buying appears to be slightly better ... Export demand good*

ALTHOUGH new business at PITTSBURGH continues in such volume as to support not more than 40 per cent of ingot capacity, sentiment in steel circles has taken a turn for the better. This feeling in undoubtedly due to the belief that the drop in incoming business has about reached bottom and that the greater portion of March will be a leveling off period. There has been a slight indication that miscellaneous purchases are a little more numerous and the placing of moderate automotive tonnages in the past week has also furnished grounds for a slightly better outlook. No rapid or substantial increase in the volume of fresh orders, however, is looked for during the remainder of this quarter.

Buying has been steadier during

the past ten days at CLEVELAND and YOUNGSTOWN, leading to the belief in some quarters that the severest part of the decline is over. Bright spots include orders from automotive and refrigerator manufacturers, additions to the large backlogs held by alloy steel divisions, and requests for quicker deliveries by a few consumers. Predictions for the immediate future remain conservative, however, and it is not expected that an upward movement of any proportions can be experienced right away. Considerable tonnage is being held up at the request of consumers.

At some CHICAGO mills incoming orders have increased slightly, but not significantly. It is commonly believed among steel sellers here that another 60 days must elapse before new business will show a broad improvement with lasting qualities. In late April or May, seasonal influences are expected to combine with increased export demand to bring about this diversified betterment. Considerable export inquiry is still apparent at some CHICAGO mills, though but little materializes into orders.

In anticipation of considerable improvement in the spring, some CHICAGO mills are actively soliciting consumers to place tonnage on the books now as a precaution in case another rush for steel develops. Such solicitation pre-supposes either a continuous firm market, or protection for the customer should prices break before shipment.

A slight upward trend in volume of demand is seen by some mill officials at BUFFALO. New orders are coming in at what is termed a fair rate and outgoing shipments remain in good volume.

Scattered automotive purchases of flat steel during the past week tended to sustain the SOUTHERN OHIO steel market.

There has been no noteworthy change in the volume of incoming business in the Philadelphia area. Buying is in scattered lot and tonnages per order are very small. The largest single outlet at present is probably the export market, where moderate orders continue to be booked with a fair degree of regularity.

The surprisingly good export de-

mand is a feature of steel activity in NEW YORK. Although exporters are hampered in doing business in a good many countries, owing to exchange difficulties and other restrictions, there is an increasingly good total volume from world markets as a whole. One company states that its February export orders have been the largest in total volume since September. Domestic business appears to have taken a slightly upward turn, but the indications are so slight that they are not conclusive.

## PRICES

*... General structure remains firm*

THE moderate sized tonnages of flat rolled products placed by some automobile companies in the past 10 days at published base prices are considered to have been substantial enough to furnish a test for the flat rolled price structure. Concrete bar quotations remain spotty. With no change in present quotations, second quarter prices are expected to be announced soon.

## PIG IRON

*... Shipments still lower; export inquiry more active*

SHIPMENTS are tapering and melters, particularly jobbing foundries, are operating at a lower rate than last week. In contrast to the slack domestic market, foreign inquiry has increased and some sellers look for the next important market move to be in the export situation.

The PITTSBURGH district finds little change in new business and shipments while CLEVELAND reports deliveries under January, but requests for quicker shipments from several large melters, and CHICAGO notes improved movement of foundry coke. Inland Steel Co. banked a furnace, and 22 of the CHICAGO area's 38 stacks now are active. The Interlake Iron Co.'s Zenith furnace, Duluth, was banked early this week.

Meanwhile pig iron sellers at NEW



YORK report a considerable increase in inquiries from abroad, and placing of more orders, a development hampered by shortage of ship space. Shipments are slowing at PHILADELPHIA and new buying continues light. Production of gray iron and castings in that area declined in January, the Industrial Research Department, University of Pennsylvania, reports.

Melters in SOUTHERN OHIO show little interest in buying and stockpiles at St. Louis are considered ample. The NEW ENGLAND melt is estimated at 70 to 75 per cent of capacity, with little evidence of any slowing in demand for castings from metal-working plants.

Republic Steel Corp. will rebuild one of its Thomas blast furnaces, at Birmingham, at a cost of about \$250,000. Work was to begin Feb. 29.

## IRON ORE

*... January consumption 5,289,308 tons ... Stocks Feb. 1 were 30,189,247 tons*

CONSUMPTION of Lake Superior iron ore in January amounted to 5,289,308 gross tons, a decrease of 249,066 tons from the previous month and a gain of 2,362,602 tons over the same month a year ago, according to monthly report of the Lake Superior Iron Ore Association.

There were 30,189,247 gross tons of ore on hand at furnaces and Lake Erie docks Feb. 1, a decrease of 5,250,526 tons from a month ago and as against 31,688,905 gross tons on the same date a year ago.

There were 142 furnaces using Lake ore in blast Feb. 1, a decrease of 13 from the previous month out of a total of 189.

## MERCHANT BARS

*... Orders improve slightly ... Export buying a help*

A SMALL pickup has been noted in hot rolled bar bookings at PITTSBURGH, but the change is not considered significant. Some of the new business has emanated from automotive centers. Miscellaneous customers are still taking shipments against mill backlogs and are, to some extent, dissipating some of their inventories in order to maintain their current production activity. The pickup in new business is expected to be very gradual.

Combined domestic and export orders of CLEVELAND sellers for February just about equalled the January

volume. Domestic business alone fell below January, however. Cold finished bar orders for the month were off from January.

In CHICAGO, demand is still light. Not until April or later do most producers look for a strong upturn. Some farm tractor plants are slowing down their production schedules, and it is understood that confidence in near future prospects is lacking, but that hopes for a good year are undimmed.

## TUBULAR GOODS

*... Demand is only fair ... Oil country sales lower*

TOTAL tubular goods demand at PITTSBURGH is only fair, with some contraction in the volume of oil country goods specifications. Jobber stocks of standard pipe are fair and movement of this product from the mills has been affected somewhat by unseasonable weather recently.

Orders are spotty at CLEVELAND and YOUNGSTOWN. Operations of LORAIN mills are well maintained, however. An interesting development in that city has been the piercing of high chrome stainless to make thick wall tubing for oil refinery work, which involves the use of special equipment.

## SEMI-FINISHED STEEL

*... Demand holds at recent levels*

SEMI-FINISHED steel demand at PITTSBURGH is holding at recent levels with non-integrated mills specifying at a better rate than a month ago. Wire rod tonnages are being booked at about the same level as a few weeks ago. Forging materials remain active at CLEVELAND, partly due to small Government educational munitions jobs throughout the nation.

## COLD FINISHED BARS

*... Automatic buying brings expansion in orders*

COLD finished bar demand has expanded in the past 10 days due mainly to placing of orders by automotive companies. This placement represents periodic buying, against which specifications will come later at regular intervals. Jobber purchases are still at a comparatively low level and the majority of customers are still depending to some extent on inventories.

## RAILROAD BUYING

*... New York Central program is 1500 cars and 25 locomotives*

NEW YORK CENTRAL LINES will close bids on March 13 on 1000 all-steel box cars for its subsidiary, the Pittsburgh & Lake Erie. On March 4 bids will be closed on 25 heavy freight locomotives of the 4-8-2 type. No action is contemplated in the near future on 1000 gondola cars for the New York Central main division, but it is probable that the road will build 500 covered hopper cars for cement at its Despatch, Inc., shops at Rochester, N. Y. The P. & L. E. cars will take 12,000 to 15,000 tons of steel.

U. S. War Department has ordered 24 box cars from Greenville Steel Car Co. and six flat cars from Haffner-Thrall Car Co. The latter company was also low bidder on four freight cars for U. S. Navy Department, and General American Transportation Corp. was low on one tank car. Pacific Electric has placed 10 passenger cars with Pullman-Standard Car Mfg. Co.

Blaw Knox Co. has received an order from the Bessemer & Lake Erie Railroad to equip 100 box cars with its newly developed open mesh steel running boards and brake steps. This safety item is an adaptation of Blaw Knox electroforged grating.

The Western Association of Railway Executives has received bids on a large quantity of standard design covered hopper cars in 500-car lots. The purpose of this inquiry is to analyze the bids to determine if price advantages can be obtained through the purchase by the association of equipment for member railroads. At least eight railroads are interested in this pool purchase plan. It is understood, however, that each road will carry on individual transactions and that there will be no common buying agency, though in each case, the price savings, if any, will apply.

The Burlington has ordered three coaches, one baggage car and one diner-lounge, all of stainless steel from the Edward G. Budd Mfg. Co. This order is in addition to two new Zephyr trains which were ordered recently. Each Zephyr train will consist of eight stainless steel cars to be built by Budd and a 4000 hp. diesel engine to be supplied by Electro Motive Corp. The two trains are for Burlington subsidiaries, the Colorado & Southern, and the Fort Worth & Denver City.

## REINFORCING BARS

*... Awards in low volume ...  
Inquiries also limited*

**R**EINFORCING steel awards of 2900 tons are the lowest of the year thus far. The only letting of size is 1300 tons for a War Department building in Washington.

Inquiries of 4355 tons include 1200 tons for a Government hospital at Carrville, La., and 1150 tons for the Queens-New York midtown tunnel.

A considerable tonnage of concrete bars is overhanging the market and makers expect most of this to be placed in the near future.

The price situation remains as it was a week ago with actual quotations ranging from the full published price to as much as \$3 and \$5 below that level.

## WIRE PRODUCTS

*... Pittsburgh producers see a little change for the better*

**I**NCOMING tonnages have not been large but there is concrete evidence at PITTSBURGH of a quickening in merchant wire demand. Requirements for these products are expected to expand considerably upon the first sign of open weather. Orders for manufacturers' wire have also gained in the past few weeks.

Production at CLEVELAND continues ahead of orders. Demand for merchant products shows only slow improvement. Manufacturers' wire, rods, and special products for both domestic and export markets are reported about on a par with other recent weeks.

Incoming business at CHICAGO is slow. Industrial consumers seem to have sufficient finished goods on hand to take care of their current trade. The seasonal spring demand from the country is expected at almost any time but recent snows have delayed these orders.

An independent wire producer at PITTSBURGH has published new extras on bright, galvanized, tinned, coppered, and liquor finished wire and spring wire. No overall change has been made but several size extras have been advanced slightly, the new extras to be effective immediately. The changes are the result of a recent analysis of mill costs.

With barbed wire and twisted barbed wire now quoted column 70, con-

sumers seeking the delivered price merely take column 70 as base and add the necessary columns for the freight. Each column is equivalent to \$1 per net ton or 5c. per 100 lb. All freight is in multiples of five. Hence, if the price is column 70 and the freight is 20c., then the delivered price is column 74. If the freight is 24c. delivered, the price is still column 74, but if freight is 25c., the delivered price is column 75. After the freight is arrived at, allowances are deducted in multiples of five. Once established, this system is simple, because even though the base column changes, the customer by referring to his chart can always find his price without difficulty.

## ... PLATES ...

*... Domestic buying light ...  
Export orders are fair*

**D**EMAND for plates at PITTSBURGH has not changed from a week ago and the current volume of business can be considered as only fair. Rivers Terminal Corp., New Orleans, recently ordered four gasoline barges from Nashville Bridge Co., Nashville, Tenn. The project will require about 900 tons of plates.

Plate demand in EASTERN PENNSYLVANIA continues to move sidewise, with total orders showing little week-to-week deviation. Considerable attention is directed toward the export market and moderate tonnages are being booked, especially from the Scandinavian countries.

## SHEETS AND STRIP

*... Automotive buying brings moderate increase in total orders*

**H**OT and cold rolled sheets were in better demand at PITTSBURGH last week, most of the improvement resulting from periodic automotive buying. At least three automobile companies have made moderate sized buys in the past 10 days at published prices, which action is interpreted by many in the trade as representing a legitimate test of the flat rolled price structure, for the time being at least.

Of quite small proportions but nevertheless possibly suggesting a trend, miscellaneous buying of sheets and strip has been at a slightly higher

level in the past week. Comparisons with tonnages booked a month ago are meaningless since incoming business at that time was almost at a standstill. Producers are able to give prompt service on both hot and cold rolled sheets as backlogs have been reduced substantially since the first of the year and some tonnage on the books remains in suspension pending subsequent release by the consumer. It is significant that the amount of outright cancellations during the current leveling off period has been practically nil.

A slight improvement in orders is also noted at CLEVELAND and YOUNGSTOWN, with automotive releases showing a gain during the past week. Electrical sheets remain in good demand. The movement of galvanized sheets is a trifle better. City Auto Stamping Co. at Toledo is reported to have received a large contract for stampings for Sears-Roebuck refrigerators through Sunbeam Electric Co.

Sheet and strip tonnage as a whole was slightly better at CHICAGO than in the previous week. Specifically nothing of importance has been reported except a Hudson buy in Detroit, believed to total about 3500 tons. Prices were said to be firm in this transaction. For the most part, CHICAGO steel sellers are not looking for a broad pickup in demand for another 60 days.

Scattered orders from a number of automotive manufacturers sustained the SOUTHERN OHIO sheet volume at approximately 50 per cent of capacity during the past week. Stove and refrigerator manufacturers continue to make purchases at near to normal quantities. Mill operations continue to run ahead of bookings.

## SHIPBUILDING

*... Navy asks bids on 11,415 tons of steel*

**T**HE Bureau of Supplies and Accounts, Navy Department, Washington, will open bids on March 12 for 11,415 tons of plates, sheets, strip, shapes and bars for stock, repairs and new ship construction at nine yards. The principal requirements to be purchased include 7240 tons of medium black plates, 2417 tons of medium black shapes, 612 tons of medium black bars and 553 tons of medium galvanized plates.

## STRUCTURAL STEEL

... Awards and inquiries are in light volume this week

FABRICATED structural steel awards dropped to 9850 tons from 21,700 tons in the previous week. The only lettings of size are 4500 tons for a War Department building in Washington and 1260 tons for the Robinson Ferry bridge over the Eel River at Scotia, Cal.

Structural steel projects are also lower at 12,600 tons against 34,700 tons last week. The only large inquiries reported are 2000 tons for the Fort Hamilton High School in Brooklyn, and 1000 tons for apartment buildings in 57th and 58th Streets, New York.

The Department of Water and Power, Los Angeles, will take bids March 20 on 2200 tons of plates for replacement siphons.

## TIN PLATE

... Operations decline to 55% but may be near bottom

THE volume of tin plate specifications is steady but operations have leveled off two points this week to 55 per cent. There are indications that the present operating rate is fairly well balanced with the volume of incoming business and no further declines of importance are expected in the near future. In view of the heavy purchasing by can companies last fall, the present rate of activity is not considered unsatisfactory and, of course, represents considerably more actual tin plate being produced than at a similar operating rate a few years ago. Capacity has been expanded in the past several years by the addition of cold reduced tin plate facilities while hot packed capacity has not been officially

retired or eliminated, even though much of it has only been used during peak periods of demand.

## BOLTS, NUTS AND RIVETS

... February orders slightly ahead of January's

AT CLEVELAND, bolt and nut producers report February order volume slightly ahead of January, the average of various classifications probably being around 10 per cent. Producers still have a little backlog, but it will soon be exhausted. In some quarters it is believed more action in Europe this spring will be reflected quickly in domestic markets. The amount of speculative buying by domestic consumers is reported to have been negligible.

## LABOR BOARD RULINGS

WASHINGTON—The Labor Board in the past week:

Ordered Combustion Engineering Co., Inc., to bargain with the CIO's Amalgamated Association of Iron, Steel and Tin Workers as exclusive representative of employees in the Hedges-Walsh-Weidner division, Chattanooga, Tenn.

Provided that production and maintenance employees of Central Foundry Co., Bessemer, Ala., will vote whether they desire to be represented by the Amalgamated Association through SWOC. The AFL's International Molders' Union announced it will not take part in the election.

Certified the CIO-UAW as sole bargaining agency in two units including service salesmen, and maintenance and repair workers of Chrysler New York Co., Inc., at its West End Avenue Service Station, New York.

Ordered an election among produc-

tion and maintenance employees of Linderme Tube Co., Cleveland, in a choice between the AFL's Federal Labor Union, or the CIO-UAW.

Certified the Car Foundry Workers Union, Inc., unaffiliated, as sole bargaining agent for Pressed Steel Car Co. production and maintenance employees at McKees Rocks, Pa. An election showed: 680 for the unaffiliated union, 442 for the SWOC, and 22 for neither.

Ruled that the Lancaster Iron Works, Lancaster, disestablished the Iron Workers Union, reimburse employees for all dues collected for that organization, reinstate 39 employees with back pay, and bargain collectively with the CIO Amalgamated Association.

## Tool and Equipment Exhibit To Be Held at Bridgeport

AN industrial tools and equipment exhibition is to be held at the State Armory, Bridgeport, Conn., March 6 to 9, under sponsorship of the Bridgeport Tool Engineers Association, Inc., a local group not affiliated with any national organization. More than 100 exhibitors have taken space at the armory and will display small tools, cutters, gages, heat treating equipment, electrical machinery, productive machinery, presses, material handling apparatus, welding equipment and many other items of interest to the productive executive. Although the attendance will be regional in character, the exhibitors are from all over the country. Invitations have been issued to about 50,000 engineers, buyers and production men in the New England area.

Plant visits have been planned and there will be some technical sessions during the four days of the exhibit. R. T. Phipps, of the Bullard Co., is manager of the exhibit, and B. A. Page is chairman of the executive committee.

## Weekly Bookings of Construction Steel

	Week Ended				Year to Date		
	Feb. 27, 1940	Feb. 20, 1940	Feb. 13, 1940	Jan. 23, 1940	Feb. 21, 1939	1940	1939
Fabricated structural steel awards ....	9,850	21,700	21,760	10,450	13,500	137,310	152,950
Fabricated plate awards .....	5,055	800	0	16,750	2,555	28,990	28,255
Steel sheet piling awards .....	1,790	2,135	100	0	0	6,375	7,960
Reinforcing bar awards .....	2,900	6,200	11,225	7,000	3,100	63,370	82,895
Total Letting of Construction Steel..	19,595	30,835	33,085	34,200	19,155	236,045	272,060



# Current Metal Working Activity

Latest Data Assembled by THE IRON AGE from Recognized Sources

	January 1940	December 1939	November 1939	December 1938	12 Months 1939	12 Months 1938
<b>Steel Ingots: (gross tons)</b>						
Monthly output <sup>a</sup>	5,017,588	5,164,420	5,462,616	3,130,746	45,768,899	27,742,225
Average weekly output <sup>a</sup>	1,132,638	1,168,421	1,273,337	708,314	877,808	532,072
Per cent of capacity <sup>a</sup>	83.18	85.57	93.26	52.79	64.29	39.65
<b>Pig Iron: (gross tons)</b>						
Monthly output <sup>b</sup>	3,600,020	3,768,336	3,720,436	2,210,728	31,533,370	18,782,236
<b>Raw Materials: (net tons)</b>						
Coke output <sup>c</sup>		5,031,797	4,912,773	3,438,445	44,425,123	32,495,800
Lake ore consumed <sup>d</sup> (gross tons)	5,289,308	5,538,374	5,477,969	3,040,700	44,361,289	25,703,050
Scrap iron and steel consumed <sup>e</sup>	3,775,000	3,805,000	4,025,000	2,411,977	35,006,000	21,528,000
<b>Castings: (net tons)</b>						
Malleable, orders <sup>f</sup>		45,978	51,778	35,633	489,482	289,384
Steel, orders <sup>f</sup>		64,143	99,899	38,342	685,074	333,278
<b>Finished Steel: (net tons)</b>						
Trackwork shipments <sup>g</sup>		7,355	6,640	2,840	69,250	37,336
Fabricated shape orders <sup>h</sup>		84,383	99,316	163,445	1,305,049	1,256,639
Fabricated plate orders <sup>h</sup>		23,627	26,020	28,218	357,393	285,061
U. S. Steel Corp. shipments <sup>g</sup>	1,145,592	1,443,969	1,406,205	765,868	11,707,251	7,315,506
<b>Fabricated Products:</b>						
Automobile production <sup>h</sup>		462,500††	350,000††	388,346	3,725,000††	2,655,171
Steel furniture shipments <sup>g</sup>		\$2,159,729	\$2,142,154	\$1,982,023	\$22,609,168	\$20,355,973
Steel boiler orders <sup>g</sup> (sq. ft.)		553,796	802,033	891,926	11,098,316	4,199,442
Locomotives ordered <sup>i</sup>	28	127**	41	28**	415	228
Freight cars ordered <sup>i</sup>	209	4,381**	7,691	2,674**	56,915	16,539
Machine tool index <sup>j</sup>	93.3	93.3	91.2	*	70.0	*
Foundry equipment index <sup>k</sup>	197.9	164.8	192.2	141.8	196.5†	106.5†
<b>Non-Ferrous Metals: (net tons, U. S. only)</b>						
Lead shipments <sup>l</sup>	39,875	44,881	64,365	33,908	555,074	421,625
Lead stocks <sup>l</sup>	68,539	58,777	58,061	115,902		
Zinc shipments <sup>m</sup>	57,551	53,468	64,407	39,354	598,972	395,554
Zinc stocks <sup>m</sup>	65,602	65,995	61,522	126,769		
Tin deliveries <sup>n</sup> (gross tons)	9,780	11,366	7,870	3,400	71,896	50,660
Refined copper deliveries <sup>o</sup>	108,465	107,380‡	*	47,804	948,559	607,672
Refined copper stocks <sup>o</sup>	135,441	159,485	*	289,755	*	*
<b>Exports: (gross tons)</b>						
Total iron and steel <sup>p</sup>		600,437	605,555	490,095	6,076,429	5,148,006
All rolled and finished steel <sup>p</sup>		280,992	208,233	123,006	1,883,506	1,392,703
Semi-finished steel <sup>p</sup>		78,636	74,868	18,141	328,893	249,635
Scrap <sup>p</sup>		204,298	271,293	321,261	3,551,589	2,974,375
<b>Imports: (gross tons)</b>						
Total iron and steel <sup>p</sup>		14,709	15,216	28,767	315,161	264,550
Pig iron <sup>p</sup>		1,318	2,774	1,237	38,592	33,088
All rolled and finished steel <sup>p</sup>		3,346	4,398	12,744	156,707	155,535

†Three months' average. \*Not available. ††Preliminary. \*\*Includes yearly adjustments. ‡Five-months' average.

Source of data: <sup>a</sup>American Iron and Steel Institute; <sup>b</sup>THE IRON AGE; <sup>c</sup>Bureau of Mines; <sup>d</sup>Lake Superior Iron Ore Association; <sup>e</sup>Bureau of the Census; <sup>f</sup>American Institute of Steel Construction; <sup>g</sup>United States Steel Corp.; <sup>h</sup>Preliminary figures from Ward's Automotive Reports—Final figures from Bureau of the Census, U. S. and Canada; <sup>i</sup>Railway Age; <sup>j</sup>Foundry Equipment Manufacturers Association; <sup>k</sup>American Bureau of Metal Statistics; <sup>l</sup>American Zinc Institute; <sup>m</sup>New York Commodity Exchange; <sup>n</sup>Copper Institute; <sup>o</sup>Department of Commerce; <sup>p</sup>British Iron and Steel Federation; <sup>q</sup>Institute of Scrap Iron and Steel.

# ...NON-FERROUS...

... Heavy copper buying reported ... Spelter price raised  $\frac{1}{4}$ c.; sales improve ... Lead demand continues active ... Tin quotas slashed to 80 per cent.

NEW YORK, Feb. 27—The non-ferrous market was dragged from the doldrums in the past week by a sudden revival of copper and spelter buying, an increase in zinc quotations and a drastic cut in second quarter tin quotas. The improvement in copper buying noted here a week ago gained sharp impetus last Tuesday on the basis of rumors of an impending price rise and over 76,000 tons of the red metal was sold that day. The bulk of this tonnage went at the old quotation of 11.25c., but enough was sold at 11.50 to establish that level.

Tuesday's sales, which were the third largest on record, were mostly for April and May. Over the remainder of the week sales slowly receded to "normal" levels and by Friday were down to around 1650 tons. Simultaneously with the increase in the producers' price, both the outside market and the export market rose to almost  $\frac{1}{2}$ c. above the producers' price. However, as producers' sales declined, these prices also worked lower and this morning March metal for export was around 11.75c., f.a.s., and the outside market nominal at 11.75c. to 11.80c. The

week's heavy purchases brought the February sales total close to 140,000 tons, which would indicate that the market is in for another protracted period of dullness. The 11.50c., Connecticut Valley, quotation of the primary producers, meanwhile appears firmly entrenched.

## Zinc

The bullishness prevalent in the lead and copper markets in the past week extended into the spelter market, and prime Western sales for the period gained to 7831 tons, from 1160 tons in the preceding period. The increase in sales was capped by a price advance of  $\frac{1}{4}$ c. to a basis of 6.14c. per lb., New York, on Monday. Apparently, however, consumers had already covered their most pressing needs, for only a very desultory demand was reported today. The bulk of the week's sales, over 7500 tons, were settled on the basis of 5.89c. per lb., New York. Shipments for the week were 3818 tons of common grades, as against 3237 in the previous week, and backlogs at the close of the week stood at 32,251 tons.

## Lead

A good demand for lead persisted all week and several sellers entered the current week with substantial waiting lists. Battery makers, preparing for the spring season, were back in the market during the week and accounted for a large portion of the week's sales. While the bulk of the demand was for March, which is estimated at about 80 per cent covered, there was still some February shipment called for. Quotations were unchanged all week at 5c. per lb., New York. Shipments in January declined to 39,875 tons from 44,881 tons in December, while production gained to 58,777 tons from 58,061 tons in the closing month of the past year. This contradictory movement brought an advance in stocks to 68,539 tons at the close of January from 58,777 tons at the close of December. The January shipments were the lowest since June of 1938.

## Tin

At the meeting of the International Control Committee yesterday, quotas for the second quarter were drastically cut to 80 per cent from 120 per cent ruling in the present quarter. This reduction, which took the trade by surprise by its severity, is equal to about 7000 tons a month and brings output down to almost the exact level of estimated world consumption, leaving no margin for holdups, delays, etc., which might reasonably be expected in war time. Previous to the meeting, there was practically no trading, but as soon as the committee's action became known an active demand developed and prices here rose to 48.50c. per lb., New York, today, as against 46.10c. previous to the meeting. In London, prices rose £7 10s to £254 10s on strength of the reduction. Much of the new demand went unsatisfied, as importers were reluctant to part with supplies in view of the fact that a further increase in prices appears probable.

## NON-FERROUS PRICES

Cents per lb. for early delivery

	Feb. 21	Feb. 23	Feb. 24	Feb. 26	Feb. 27
Copper, Electrolytic <sup>1</sup>	11.50	11.50	11.50	11.50	11.50
Copper, Lake	11.50	11.50	11.50	11.50	11.50
Tin, Straits, New York	46.35	46.10	...	47.10	48.50
Zinc, East St. Louis <sup>2</sup>	5.50	5.50	5.50	5.75	5.75
Lead, St. Louis <sup>3</sup>	4.85	4.85	4.85	4.85	4.85

<sup>1</sup> Delivered Conn. Valley. Deduct  $\frac{1}{4}$ c. for New York delivery. <sup>2</sup> Add 0.39c. for New York delivery. <sup>3</sup> Add 0.15c. for New York delivery.

## Warehouse Prices

Cents per lb., Delivered

	New York	Cleveland
Tin, Straits, pig	49.50c.	51.25c.
Copper, Lake	13.25c.	12.625c.
Copper, electro	12.75c.	12.625c.
Copper, castings	12.375c.	12.375c.
*Copper sheets, hot-rolled	20.12c.	20.12c.
*Yellow brass sheets	18.31c.	18.31c.
*Seamless brass tubes	21.06c.	21.06c.
*Seamless copper tubes	20.62c.	20.62c.
*Yellow brass rods	14.26c.	14.26c.
Zinc slabs	7.10c.	7.75c.
Zinc sheets, No. 9 casks	12.00c.	13.35c.
Lead, American pig	6.00c.	5.50c.
Lead, bar	8.45c.	8.25c.
Lead, sheets, cut	8.50c.	8.50c.
Antimony, Asiatic	16.00c.	17.00c.
Alum., virgin, 99 per cent plus	21.50c.	22.50c.
Alum., No. 1 remelt, 98 to 99 per cent	19.00c.	19.50c.
Solder, $\frac{1}{2}$ and $\frac{1}{2}$	30.60c.	29.75c.
Babbitt metal, anti-friction grade	27.50c.	20.00c.

\*These prices, which are also for delivery from Chicago warehouses, are quoted with the following percentages allowed off for extras: on copper sheets, 33 $\frac{1}{3}$ ; on brass sheets and rods, 40; on brass tubes, 33 $\frac{1}{3}$ , and copper tubes, 40.

## Old Metals

Cents per lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators. Selling prices are those charged to consumers after the metal has been prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	9.25c.	9.875c.
Copper, hvy. and wire	8.50c.	8.875c.
Copper, light and bottoms	7.25c.	7.75c.
Brass, heavy	5.00c.	5.50c.
Brass, light	4.125c.	4.875c.
Heavy machine composition	7.75c.	8.375c.
No. 1 yel. brass turnings	4.75c.	5.75c.
No. 1 red brass or comp. turnings	7.375c.	7.875c.
Lead, heavy	4.00c.	7.375c.
Cast aluminum	8.00c.	9.00c.
Sheet aluminum	14.00c.	15.00c.
Zinc	2.75c.	4.00c.

## Miscellaneous Non-Ferrous Prices

ALUMINUM, delivered: virgin, 99 per cent plus, 20c.-21c. a lb.; No. 12 remelt No. 2 standard, 19c.-19.50c. a lb. NICKEL, electrolytic, 35c.-36c. a lb. base refinery, lots of 2 tons or more. ANTIMONY, prompt: Asiatic, 16.50c. a lb., New York; American, 13c. a lb., f.o.b. smelter. QUICK-SILVER, nominally, \$183 to \$185 per flask of 76 lb. BRASS INGOTS, commercial 85-5-5-5, 12c. a lb.

# IRON AND STEEL SCRAP

*... Steel scrap composite price unchanged for first time since early January ... Some grades lower.*

**F**EB. 27—For the first time since the issue which went to press on Jan. 16, the steel scrap composite price of THE IRON AGE is unchanged. This week's figure remains at \$16.71. During the first three issues of January the composite stood at \$17.67, following an almost uninterrupted decline from the peak of early October. After the middle of January there was a further decline each week until this week.

There is not sufficient activity in the market to determine whether prices have actually reached a bottom. On some of the minor grades there have been further declines. It cannot be said that the scrap trade itself has become imbued with any spirit of bullishness as to the course of prices or volume of business in the next few weeks. However, scrap is in a position to be quickly affected by any noticeable improvement in the demand for steel.

## Pittsburgh

The market is exceptionally dull with very few transactions taking place. Current conditions warrant No. 1 heavy melting being quoted unchanged this week at \$17 to \$17.50. Many quotations on secondary grades are nominal owing to lack of demand. Railroad lists closing next week are expected to clarify the market to some extent.

## Chicago

Except for minor transactions, there has been little activity of any kind in this market during the past week. Brokers continue to buy heavy melting steel at \$15.50. A large mill may be in the market next week but no important buying activity is expected until then.

## Philadelphia

For the first time in many weeks, there are signs of a firmer undertone to the market here and it now appears that the bottom of the decline has been reached. The lack of mill support has been counteracted by the slowness with which supplies are being released by the small collectors. The resumption of buying for export has also contributed to the better tone. Quotations on the primary grades are unchanged this week, but there have been some minor downward revisions of secondary grades. A boat arrived Monday to pick up a cargo of about 4000 tons and two more are ex-

pected in March. Buying for the boat now loading is being done at \$16.75 to \$17 for No. 1 steel and \$15.25 to \$15.50 for No. 2. While these prices are lower than were paid for the previous cargo, when the freight is taken into consideration, they are still above domestic prices. Budd recently sold 1500 tons of bundles at about \$16, f.o.b., equal to around \$17.50, delivered Coatesville. This tonnage was not part of a new list. The March Pennsylvania list of 27,710 tons includes 8000 tons of No. 1 scrap.

## Youngstown

The market continues stagnant here and awaiting a trend. Nominal prices are unchanged this week. While it is believed mills could not buy tonnages at any marked reductions, closing of the monthly railroad lists next week is awaited for a clue to the actual condition. Shipments are still under restrictions and such deliveries as are being made consist of only small amounts.

## Cleveland

Scrap is no better and no worse here this week. Apparently the nominal printed prices are in line for the time being. Some mill buyers incline to the belief that deliveries are harder to obtain than conditions warrant. Principal railroad lists closing next week are expected to be helpful in gaging the market.

## Buffalo

About 4000 tons of No. 2 heavy melting steel was purchased this week by a large consumer in the district at a price reported to be in the range of \$14.50 to \$15. At the same time No. 1 steel continues to be quoted at \$16 to \$16.50. Cast scrap moves only by the occasional carload.

## St. Louis

An East Side mill bought 5000 tons of scrap, half melting steel and half specialties at present prices, 25c. to 50c. a ton below previous quotations. Mills are out of the market because of comfortable inventories and commitments and lack of incoming business. Shipments from the country are improving, but cold weather still hampers the movement. Railroad lists: Pennsylvania, 27,700 tons; Baltimore & Ohio, 6500 tons; Chicago, Milwaukee, St. Paul & Pacific, 1000 tons, and Alton, 500 tons.

## Cincinnati

All important items on the list have been cut 25c. to 50c. a ton. Trading is in small volume.

## Birmingham

With bad weather still lingering, thus reducing accumulations, the stagnant condition of the scrap market which has prevailed since the holidays continues. Little metal has been brought to local yards, and that is just as well, for the movements to consumer have been almost nil and dealers are simply marking time. There are no indications that the larger buyers are considering entering the market.

## New York

The market is quiet, but prices generally have held at last week's levels. British boats for loading scrap are being furnished a bit more regularly than in the recent past.

## Boston

Although most yards are partially cleared of snow, and loading at the Army base for export has resumed, very little scrap changed hands the past week. Trucking in and out of yards is still hampered, and consumers like the American Steel & Wire Co., Worcester, Mass., and the Washburn Wire Co., Phillipsdale, R. I., apparently are not interested in scrap. A sale of a round tonnage of No. 1 heavy melting steel scrap for export is reported at \$15.50 a ton, delivered dock, up 50c. from a week ago, but the general paid price remains at \$15 a ton and there is not much doing. A boat is overdue at the Mystic wharf, but the exporter is covered on this craft, at least. Shipments to Pennsylvania are confined to scattered carlots of steel turnings, blast furnace material and bundled skeleton.

## Detroit

An almost general reduction in brokers' and dealers' buying prices for scrap went into effect in the past week, resulting directly from lower-priced sales into consumption locally. The new prices were expected to affect directly the many automotive lists which were closed as the month ended. Direct reductions were felt in open-hearth grades. Although no new mill orders for blast furnace grades were known to have been placed, there was an anticipation of lower prices on these items, too, and minor activity on blast furnace scrap followed this suggestion. A sustaining strength has been lent to cast iron items by the approach of the automotive programs, although these grades are not moving at all freely yet. Scrap production in March is estimated 20 per cent up from the February level.

## Toronto

Firmer prices in a few items appeared in the iron and steel scrap lists during the week, when local dealers marked up buying prices on busheling, steel turnings and cast borings, 50c. per ton. In recent weeks there has been sharp improvement in demand for these materials from electric furnace operators in the Niagara Peninsula field. Other materials are firm and unchanged. Mills in the Hamilton district are paying \$15.50 for No. 1 heavy melting steel delivered.



# Iron and Steel Scrap Prices

## PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	\$17.00 to \$17.50
Railroad heavy melting	18.00 to 18.50
No. 2 heavy melting	15.50 to 16.00
Railroad scrap rails	18.00 to 18.50
Rails 3 ft. and under	20.50 to 21.00
Comp. sheet steel	17.00 to 17.50
Hand bundled sheets	16.00 to 16.50
Heavy steel axle turn.	15.00 to 15.50
Machine shop turnings	10.50 to 11.00
Short. shov. turnings	12.00 to 12.50
Mixed bor. & turn.	8.00 to 8.50
Cast iron borings	8.00 to 8.50
Cast iron carwheels	18.50 to 19.00
Heavy breakable cast.	15.00 to 15.50
No. 1 cupola cast	18.00 to 18.50
RR. knuckles & coup.	20.50 to 21.00
Rail coil springs	20.50 to 21.00
Rail leaf springs	20.50 to 21.00
Rolled steel wheels	20.50 to 21.00
Low phos. billet crops	21.00 to 21.50
Low phos. punchings	21.00 to 21.50
Low phos. heavy plate	19.50 to 20.00
Railroad malleable	21.00 to 21.50

## PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	\$17.00 to \$17.50
No. 2 hvy. mltng. steel	16.00 to 16.50
Hydraulic bund., new	17.00 to 17.50
Hydraulic bund., old	14.00 to 14.50
Steel rails for rolling	20.50 to 21.00
Cast iron carwheels	20.00 to 20.50
Hvy. breakable cast.	18.00
No. 1 cupola cast	20.00 to 20.50
Mixed yard (f'd'y) scrap	16.00 to 16.50
Stove plate (steel wks.)	15.00
Railroad malleable	21.00
Machine shop turn.	10.00 to 10.50
No. 1 blast furnace	10.00
Cast borings	10.50 to 11.00
Heavy axle turnings	15.00 to 15.50
No. 1 low phos. hvy.	21.00 to 21.50
Couplers & knuckles	21.00 to 21.50
Rolled steel wheels	21.00 to 21.50
Steel axles	21.50 to 22.00
Shafting	22.00 to 22.50
Spec. iron & steel pipe	16.00 to 16.50
Cast borings (chem.)	14.00 to 14.50

## CHICAGO

Delivered to Chicago district consumers:

Per Gross Ton	
Hvy. mltng. steel	\$15.50 to \$15.75
Auto. hvy. mltng. steel alloy free	14.50 to 14.75
No. 2 auto steel	12.50 to 13.00
Shoveling steel	15.50 to 15.75
Factory bundles	15.00 to 15.25
Dealers' bundles	13.50 to 13.75
No. 1 busheling	14.50 to 14.75
No. 2 busheling, old	5.75 to 6.25
Rolled carwheels	18.00 to 18.50
Railroad tires, cut	18.25 to 18.75
Railroad leaf springs	17.75 to 18.25
Steel coup. & knuckles	17.75 to 18.25
Axle turnings	14.50 to 15.00
Coil springs	18.75 to 19.25
Axle turn. (elec.)	16.25 to 16.75
Low phos. punchings	18.00 to 18.50
Low phos. plates 12 in. and under	17.50 to 18.00
Cast iron borings	9.00 to 9.50
Short shov. turn.	9.50 to 10.00
Machine shop turn.	8.75 to 9.25
Rerolling rails	18.25 to 18.75
Steel rails under 3 ft.	17.50 to 18.00
Steel rails under 2 ft.	18.50 to 19.00
Angle bars, steel	17.75 to 18.25
Cast iron carwheels	17.00 to 17.50
Railroad malleable	18.25 to 18.75
Agric. malleable	14.25 to 14.75
Per Net Ton	
Iron car axles	21.50 to 22.00
Steel car axles	20.25 to 20.75
Locomotive tires	14.25 to 14.75
Pipes and flues	10.75 to 11.25
No. 1 machinery cast.	13.50 to 14.00
Clean auto. cast	13.75 to 14.25
No. 1 railroad cast	13.25 to 13.75
No. 1 agric. cast	12.00 to 12.50
Stove plate	8.75 to 9.25
Grate bars	9.50 to 10.00
Brake shoes	10.50 to 11.00

## YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	\$17.00 to \$17.50
No. 2 hvy. mltng. steel	16.00 to 16.50
Low phos. plate	20.00 to 20.50
No. 1 busheling	16.25 to 16.75
Hydraulic bundles	16.50 to 17.00
Machine shop turn.	11.00 to 11.50

## CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	\$16.00 to \$16.50
No. 2 hvy. mltng. steel	15.00 to 15.50
Comp. sheet steel	15.50 to 16.00
Light bund. stampings	13.00 to 13.50
Drop forge flashings	14.00 to 14.50
Machine shop turn.	9.00 to 9.50
Short shov. turn.	10.00 to 10.50
No. 1 busheling	14.75 to 15.25
Steel axle turnings	14.50 to 15.00
Low phos. billet and bloom crops	21.50 to 22.00
Cast iron borings	10.00 to 10.50
Mixed bor. & turn.	10.00 to 10.50
No. 2 busheling	10.00 to 10.50
No. 1 cupola cast	17.00 to 17.50
Railroad grate bars	13.50 to 14.00
Stove plate	13.50 to 14.00
Rails under 3 ft.	21.00 to 21.50
Rails for rolling	20.00 to 20.50
Railroad malleable	19.50 to 20.00

## BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	\$16.00 to \$16.50
No. 2 hvy. mltng. steel	14.50 to 15.00
Scrap rails	17.00 to 17.50
New hvy. b'ndled sheets	14.00 to 14.50
Old hydraulic bundles	12.50 to 13.00
Drop forge flashings	14.00 to 14.50
No. 1 busheling	14.00 to 14.50
Machine shop turn.	9.50 to 10.00
Shov. turnings	12.50 to 13.00
Mixed bor. & turn.	10.50 to 11.00
Cast iron borings	10.50 to 11.00
Knuckles & couplers	20.00 to 21.00
Coil & leaf springs	20.00 to 21.00
Rolled steel wheels	20.00 to 21.00
No. 1 machinery cast.	17.50 to 18.00
No. 1 cupola cast	16.50 to 17.00
Stove plate	14.50 to 15.00
Steel rails under 3 ft.	21.50 to 22.00
Cast iron carwheels	17.50 to 18.00
Railroad malleable	19.00 to 19.50

## ST. LOUIS

Dealers' buying prices per gross ton delivered to consumer:

Selected hvy. melting	\$14.25 to \$14.75
No. 1 hvy. melting	13.75 to 14.25
No. 2 hvy. melting	13.25 to 13.75
No. 1 locomotive tires	15.75 to 16.25
Misc. stand. sec. rails	15.25 to 15.75
Railroad springs	16.50 to 17.00
Bundled sheets	8.50 to 9.00
No. 1 busheling	13.25 to 13.75
Cast bor. & turn.	5.00 to 5.50
Machine shop turn.	6.00 to 6.50
Heavy turnings	10.00 to 10.50
Rails for rolling	17.50 to 18.00
Steel car axles	18.00 to 18.50
No. 1 RR wrought	10.25 to 10.75
No. 2 RR wrought	13.25 to 13.75
Steel rails under 3 ft.	18.00 to 18.50
Steel angle bars	14.50 to 15.00
Cast iron carwheels	16.00 to 16.50
No. 1 machinery cast.	17.00 to 17.50
Railroad malleable	15.75 to 16.25
Breakable cast	13.75 to 14.25
Stove plate	10.00 to 10.50
Grate bars	10.00 to 10.50
Brake shoes	8.50 to 9.00

## CINCINNATI

Dealers' buying prices per gross ton at yards:

No. 1 hvy. mltng. steel	\$12.50 to \$13.00
No. 2 hvy. mltng. steel	10.50 to 11.00
Scrap rails for mltng.	17.00 to 17.50
Loose sheet clippings	8.00 to 8.50
Hydrau. b'ndled sheets	12.00 to 12.50
Cast iron borings	3.75 to 4.25
Machine shop turn.	5.00 to 5.25
No. 1 busheling	9.00 to 9.50
No. 2 busheling	3.00 to 3.25
Rails for rolling	18.50 to 19.00
No. 1 locomotive tires	14.00 to 14.50
Short rails	19.00 to 19.50
Cast iron carwheels	14.50 to 15.00
No. 1 machinery cast.	16.00 to 16.50
No. 1 railroad cast	14.00 to 14.50
Burnt cast	7.75 to 8.25
Stove plate	7.75 to 8.25
Agricul. malleable	12.50 to 13.00
Railroad malleable	15.50 to 16.00
Mixed hvy. cast.	13.50 to 14.00

## BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting steel	\$15.00
No. 2 hvy. melting steel	14.00
No. 1 busheling	13.00
Scrap steel rails	15.00
Steel rails under 3 ft.	16.00

Rails for rolling	16.50
Long turnings	5.00
Cast iron borings	7.50
Stove plate	11.00
Steel axles	20.00
No. 1 RR wrought	14.00
No. 1 cast	15.00
No. 2 cast	11.00
Cast iron carwheels	13.00
Steel car wheels	16.00

## DETROIT

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. industrial steel	12.50 to 13.00
No. 2 hvy. mltng. steel	11.50 to 12.00
Borings and turnings	6.50 to 7.00
Long turnings	6.00 to 6.50
Short shov. turnings	8.00 to 8.50
No. 1 machinery cast.	13.50 to 14.00
Automotive cast	15.00 to 15.50
Hvy. breakable cast.	10.50 to 11.00
Stove plate	8.50 to 9.00
Hydraul. comp. sheets	13.25 to 13.75
New factory bushel	12.00 to 12.50
Sheet clippings	8.25 to 8.75
Flashings	11.75 to 12.25
Low phos. plate scrap	13.50 to 14.00

## NEW YORK

Dealers' buying prices per gross ton on cars:

No. 1 hvy. mltng. steel	\$13.00 to \$13.50
No. 2 hvy. mltng. steel	11.50 to 12.00
Hvy. breakable cast.	14.00
No. 1 machinery cast.	16.00 to 16.50
No. 2 cast	12.50 to 13.00
Stove plate	10.50 to 11.00
Steel car axles	19.00 to 20.00
Shafting	19.00 to 20.00
No. 1 RR. wrought	14.00 to 15.00
No. 1 wrought long	12.50 to 13.00
Spec. iron & steel pipe	13.50 to 14.00
Rails for rolling	16.00 to 17.00
Clean steel turnings*	6.00 to 6.25
Cast borings*	6.00 to 6.25
No. 1 blast furnace	6.00 to 6.25
Cast borings (chem.)	Nominal
Unprepared yard scrap	7.00 to 7.50
Light iron	5.00 to 5.50
Per gross ton, delivered local foundries:	
No. 1 machin. cast.	\$17.00 to \$18.50
No. 2 cast	16.50 to 17.00

\* \$1.50 less for truck loads.

## BOSTON

Dealers' buying prices per gross ton on cars:

Breakable cast	\$12.65
Machine shop turn.	5.15
Mixed bor. & turn.	\$4.50 to 4.75
Bun. skeleton long	8.50 to 8.75
Shafting	17.00 to 17.25
Stove plate	9.75 to 10.00
Cast bor. chemical	8.00 to 8.50
Per gross ton delivered consumers' yards:	
Textile cast	\$17.00 to \$19.00
No. 1 machine cast.	17.00 to 19.00
Per gross ton delivered dealers' yards:	
No. 1 hvy. mltng. steel	\$13.00
No. 2 steel	12.00

## PACIFIC COAST

Dealers' buying prices per gross ton on cars:

No. 1 hvy. mltng. steel	\$10.50 to \$12.50
No. 2 hvy. mltng. steel	9.50 to 11.50

## CANADA

Dealers' buying prices at these yards; per gross ton:

	Toronto	Montreal
Low phos. steel	\$11.50	\$11.00
No. 1 hvy. mltng. steel	11.00	10.50
No. 2 hvy. mltng. steel	9.75	9.25
Mixed dealers steel	8.75	8.25
Drop forge flashings	9.75	9.25
New loose clippings	8.75	8.25
Busheling	6.00	5.50
Scrap pipe	7.75	7.25
Steel turnings	7.00	6.50
Cast borings	6.50	6.00
Machinery cast	17.00 to 18.50	
Dealers' cast	16.00 to 15.50	
Stove plate	12.00 to 11.50	

## EXPORT

Dealers' buying prices per gross ton:

New York, truck lots, delivered, bases	
No. 1 hvy. mltng. steel	\$14.00
No. 2 hvy. mltng. steel	11.50
No. 2 cast	12.00 to 12.50
Stove plate	10.00 to 10.50

Boston on cars at Army Base or Mystic Wharf

No. 1 hvy. mltng. steel	\$15.00 to \$15.50
No. 2 hvy. mltng. steel	14.00
Rail (scrap)	\$15.00 to \$15.50
Stove plate	8.00 to 8.50

Philadelphia, delivered alongside boats, Port Richmond.

No. 1 hvy. mltng. steel	\$16.75 to \$17.00
No. 2 hvy. mltng. steel	15.25 to 15.50

## PRICES ON FINISHED AND SEMI-FINISHED IRON AND STEEL

Steel prices on these pages are base prices only and f.o.b. mill unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are effected by extras, deductions, and in most cases the amount of freight which must be absorbed in order to meet competition

### SEMI-FINISHED STEEL

#### Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (Rerolling only). Prices delivered Detroit are \$2 higher. F.o.b. Duluth, billets only, \$2 higher.

Rerolling ..... \$34.00  
Forging quality ..... 40.00

#### Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

Open hearth or bessemer ..... \$34.00

#### Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

Grooved, universal and sheared ..... 1.90c.

#### Wire Rods

(No. 5 to 9/32 in.)

Pittsburgh, Chicago or Cleveland ..... 2.00c.  
Worcester, Mass. .... 2.10c.  
Birmingham ..... 2.00c.  
San Francisco ..... 2.45c.  
Galveston ..... 2.25c.  
9/32 in. to 47/64 in. \$3 a net ton higher. Quantity extras apply.

### SOFT STEEL BARS

Pittsburgh, Chicago, Gary, Cleveland, Buffalo and Birmingham ..... 2.15c.  
Detroit, delivered ..... 2.25c.  
Duluth ..... 2.25c.  
Philadelphia, delivered ..... 2.47c.  
New York ..... 2.49c.  
On cars dock Gulf ports ..... 2.50c.  
On cars dock Pacific ports ..... 2.75c.

### RAIL STEEL BARS

(For merchant trade)

Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham ..... 2.15c.  
On cars dock Tex. Gulf ports ..... 2.50c.  
On cars dock Pacific ports ..... 2.75c.

### BILLET STEEL REINFORCING BARS

(Straight lengths as quoted by distributors)

Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Cleveland, Youngstown or Sparrows Pt. .... 1.90c. to 2.15c.  
Detroit, delivered ..... 2.00c. to 2.25c.  
On cars dock Tex. Gulf ports ..... 2.25c. to 2.50c.  
On cars dock Pacific ports ..... 2.25c. to 2.50c.

### RAIL STEEL REINFORCING BARS

(Straight lengths as quoted by distributors)

Pittsburgh, Chicago, Gary, Buffalo, Cleveland, Youngstown or Birmingham ..... 1.90c. to 2.15c.  
Detroit, delivered ..... 2.00c. to 2.25c.  
On cars dock Tex. Gulf ports ..... 2.25c. to 2.50c.  
On cars dock Pacific ports ..... 2.25c. to 2.50c.

### IRON BARS

Chicago and Terre Haute ..... 2.15c.  
Pittsburgh (refined) ..... 3.75c.

### COLD FINISHED BARS AND SHAFTING\*

Pittsburgh, Buffalo, Cleveland, Chicago, and Gary ..... 2.65c.  
Detroit ..... 2.70c.

\* In quantities of 20,000 to 39,999 lb.

### PLATES

Pittsburgh, Chicago, Gary, Birmingham, Sparrows Point, Cleveland, Youngstown, Coatesville, Claymont, Del. .... 2.10c.

Philadelphia, del'd ..... 2.15c.  
New York, del'd ..... 2.29c.  
On cars dock Gulf ports ..... 2.45c.  
On cars dock Pacific ports ..... 2.60c.  
Wrought iron plates, P'g ..... 3.80c.

### FLOOR PLATES

Pittsburgh or Chicago ..... 3.35c.  
New York, del'd ..... 3.71c.  
On cars dock Gulf ports ..... 3.70c.  
On cars dock Pacific ports ..... 3.95c.

### STRUCTURAL SHAPES

Base per Lb.

Pittsburgh, Chicago, Gary, Buffalo, Bethlehem or Birmingham ..... 2.10c.  
Philadelphia, del'd ..... 2.215c.  
New York, del'd ..... 2.27c.  
On cars dock Gulf ports ..... 2.45c.  
On cars dock Pacific ports ..... 2.70c.

### STEEL SHEET PILING

Base per Lb.

Pittsburgh, Chicago or Buffalo ..... 2.40c.  
On cars dock Gulf ports ..... 2.85c.  
On cars dock Pacific ports ..... 2.90c.

### RAILS AND TRACK SUPPLIES

#### F.o.b. Mill

Standard rails, heavier than 60 lb., per gross ton ..... \$40.00  
Angle bars, per 100 lb. .... 2.70

#### F.o.b. Basing Points

Light rails (from billets) per gross ton ..... \$40.60  
Light rails (from rail steel) per gross ton ..... 39.00

Base per Lb.

Cut spikes ..... 3.00c.  
Screw spikes ..... 4.55c.  
Tie plates, steel ..... 2.15c.  
Tie plates, Pacific Coast ports ..... 2.25c.  
Track bolts, to steam railroads ..... 4.15c.  
Track bolts to jobbers, all sizes (per 100 counts) ..... 65.5

Basing points on light rails are Pittsburgh, Chicago and Birmingham; on spikes and tie plates, Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; on tie plates alone, Steelton, Pa., Buffalo; on spikes alone, Youngstown, Lebanon Pa., Richmond, Va.

### SHEETS

#### Hot Rolled

Base per Lb.

Pittsburgh, Gary, Birmingham, Buffalo, Sparrows Point, Cleveland, Youngstown, Middletown or Chicago ..... 2.10c.  
Detroit, delivered ..... 2.20c.  
Philadelphia, delivered ..... 2.27c.  
Granite City ..... 2.20c.  
On cars dock Pacific ports ..... 2.60c.  
Wrought iron, Pittsburgh ..... 4.10c.

#### Cold Rolled\*

Pittsburgh, Gary, Buffalo, Youngstown, Cleveland, Middletown or Chicago ..... 3.05c.  
Detroit, delivered ..... 3.15c.  
Granite City ..... 3.15c.  
Philadelphia, delivered ..... 3.37c.  
On cars dock Pacific ports ..... 3.65c.

\* Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base.

### Galvanized Sheets, 24 Gage

Pittsburgh, Chicago, Gary, Sparrows Point, Buffalo, Middletown, Youngstown or Birmingham ..... 3.50c.  
Philadelphia, del'd ..... 3.67c.  
Granite City ..... 3.60c.  
On cars dock Pacific ports ..... 4.00c.  
Wrought iron, Pittsburgh ..... 6.10c.

### Electrical Sheets

(F.o.b. Pittsburgh)

Base per Lb.

Field grade ..... 3.20c.  
Armature ..... 3.55c.  
Electrical ..... 4.05c.  
Motor ..... 4.95c.  
Dynamo ..... 5.65c.  
Transformer 72 ..... 6.15c.  
Transformer 65 ..... 7.15c.  
Transformer 58 ..... 7.65c.  
Transformer 52 ..... 8.15c.

Silicon Strip in coils—Sheet price plus silicon sheet extra width extra plus 25c per 100 lb. for coils. Pacific ports add 70c. a 100 lb.

### Long Ternes

No. 24 unassorted 8-lb. coating f.o.b. Pittsburgh or Gary ..... 3.80c.  
F.o.b. cars dock Pacific ports ..... 4.50c.

### Vitreous Enameling Stock, 20 Gage\*

Pittsburgh, Chicago, Gary, Youngstown, Middletown or Cleveland ..... 3.35c.  
Detroit, del'd ..... 3.45c.  
Granite City ..... 3.45c.  
On cars dock Pacific ports ..... 3.95c.

### TIN MILL PRODUCTS

#### Tin Plate

Per Base Box

Standard cokes, Pittsburgh, Chicago and Gary (100 lb.) ..... \$5.00  
Standard cokes, Granite City (100 lb.) ..... 5.10

#### Special Coated Manufacturing Ternes

Per Base Box

Granite City ..... \$4.90  
Pittsburgh or Gary ..... 4.30

#### Roofing Terne Plate

(F.o.b. Pittsburgh per Package, 112 Sheets)

	20x14 in.	20x28 in.
8-lb. coating I.C.	\$6.00	\$12.00
15-lb. coating I.C.	7.00	14.00
20-lb. coating I.C.	7.50	15.00
25-lb. coating I.C.	8.00	16.00
30-lb. coating I.C.	8.63	17.25
40-lb. coating I.C.	9.75	19.50

#### Black Plate, 29 gage and lighter\*

Pittsburgh, Chicago and Gary ..... 3.05c.  
Granite City ..... 3.15c.  
On cars dock Pacific ports, boxed ..... 4.00c.

\* Black plate base price applies to 29 gage within certain width and length limitations.

### HOT ROLLED STRIP

(Widths up to 12 in.)

Base per Lb.

Pittsburgh, Chicago, Gary, Cleveland, Middletown, Youngstown or Birmingham ..... 2.10c.  
Detroit, delivered ..... 2.20c.  
On cars dock Pacific ports ..... 2.70c.

#### Cooperage Stock

Pittsburgh & Chicago ..... 2.20c.

### COLD ROLLED STRIP\*

Base per Lb.

Pittsburgh, Youngstown or Cleveland ..... 2.80c.  
Chicago ..... 2.90c.  
Detroit, delivered ..... 2.90c.  
Worcester ..... 3.00c.

\* Carbon 0.25 and less.

#### Commodity Cold Rolled Strip

Pittsburgh, Youngstown, or Cleveland ..... 2.95c.  
Detroit, delivered ..... 3.05c.  
Worcester ..... 3.35c.

### COLD ROLLED SPRING STEEL

Pittsburgh

and

Cleveland Worcester

Carbon	0.26-0.50%	2.80c.	3.90c.
Carbon	0.51-0.75	4.30c.	4.50c.
Carbon	0.76-1.00	6.15c.	6.35c.
Carbon	1.01-1.25	8.35c.	8.55c.







## RAW MATERIALS PRICES

### PIG IRON

#### No. 2 Foundry

F.o.b. Everett, Mass.	\$24.00
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa., and Sparrows Point, Md.	24.00
Delivered Brooklyn	26.50
Delivered Newark or Jersey City	25.53
Delivered Philadelphia	24.84
F.o.b. Neville Island, Erie, Pa., Toledo, Chicago, Granite City, Cleveland and Youngstown	23.00
F.o.b. Buffalo	23.00
F.o.b. Detroit	23.00
Southern, delivered Cincinnati	23.06
Northern, delivered, Cincinnati	23.44
F.o.b. Duluth	23.50
F.o.b. Provo, Utah	21.00
Delivered, San Francisco, Los Angeles or Seattle	26.50
F.o.b. Birmingham*	19.38

\* Delivered prices on southern iron for shipment to northern points are 38c. a ton below delivered prices from nearest northern basing point on iron with phosphorus content of 0.70 per cent and over.

#### Malleable

Base prices on malleable iron are 50c. a ton above No. 2 foundry quotations at Everett, Eastern Pennsylvania furnaces, Erie and Buffalo. Elsewhere they are the same, except at Birmingham and Provo, which are not malleable iron basing points.

#### Basic

F.o.b. Everett, Mass.	\$23.50
F.o.b. Bethlehem, Birdsboro, Swedeland and Steelton, Pa., and Sparrows Point, Md.	23.50
F.o.b. Buffalo	22.00
F.o.b. Neville Island, Erie, Pa., Toledo, Chicago, Granite City, Cleveland and Youngstown	22.50
Delivered Philadelphia	24.34
Delivered Canton, Ohio	23.89
Delivered Mansfield, Ohio	24.44
F.o.b. Birmingham	18.00

#### Bessemer

F.o.b. Buffalo	\$24.00
F.o.b. Everett, Mass.	25.00
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa.	25.00
Delivered Newark or Jersey City	26.53
Erie, Pa., and Duluth	24.00
F.o.b. Neville Island, Toledo, Chicago and Youngstown	23.50
F.o.b. Birmingham	24.00
Delivered Cincinnati	24.11
Delivered Canton, Ohio	24.89
Delivered Mansfield, Ohio	25.44

#### Low Phosphorus

Basing points; Birdsboro, Pa., Steelton, Pa., and Buffalo	\$28.50
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#### Gray Forge

Valley or Pittsburgh furnace	\$22.50
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#### Charcoal

Lake Superior furnace	\$27.00
Delivered Chicago	30.34

#### Canadian Pig Iron

##### Per Gross Ton

Foundry iron	\$27.50 base
Malleable	28.00 base
Basic	27.50 base

##### Toronto

Foundry iron	\$25.50 base
Malleable	26.00 base
Basic	25.50 base

On all grades 2.25 per cent silicon and under is base. For each 25 points of silicon over 2.25 per cent an extra of 25c. is charged.

### FERROALLOYS

#### Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.	
Domestic, 80% (carload)	\$100.00

#### Spiegeleisen

Per Gross Ton Furnace	
Domestic, 19 to 21%	\$32.00
Domestic, 26 to 28%	39.50

#### Electric Ferrosilicon

Per Gross Ton Delivered; Lump Size	
50% (carload lots, bulk)	\$69.50*
50% (ton lots, packed)	82.00*
75% (carload lots, bulk)	126.00*
75% (ton lots, packed)	142.00*

#### Bessemer Ferrosilicon

F.o.b. Furnace, Jackson, Ohio	
Per Gross Ton	
10.00 to 10.50%	\$32.50
For each additional 0.50% silicon up to 12%, 50c. per ton is added. Above 12% add 75c. per ton.	
For each unit of manganese over 2%, \$1 per ton additional.	
Base prices at Buffalo are \$1.25 a ton higher than at Jackson.	

#### Silvery Iron

Per Gross Ton	
F.o.b. Jackson, Ohio, 5.00 to 5.50%	\$27.50
For each additional 0.5% silicon up to 12%, 50c. a ton is added. Above 12% add 75c. a ton.	
The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are \$1.25 a ton higher than at Jackson.	
Manganese, each unit over 2%, \$1 a ton additional. Phosphorus 0.75% or over, \$1 a ton additional.	

#### Ferrochrome

Per Lb. Contained Cr., Delivered Carlots, Lump Size, on Contract	
4 to 6% carbon	\$11.00c.*
2% carbon	17.50c.*
1% carbon	18.50c.*
0.10% carbon	20.50c.*
0.06% carbon	21.00c.*

#### Silico-Manganese

Per Gross Ton, Delivered, Lump Size, Bulk, on Contract	
3% carbon	\$98.00
2.50% carbon	103.00
2% carbon	108.00
1% carbon	118.00

#### Other Ferroalloys

Ferrotungsten, per lb. contained W del., carload	\$2.00
Ferrotungsten, 100 lbs. and less	2.25
Ferrovanadium, contract, per lb. contained V., delivered	\$2.90†
Ferrocolumbium, per lb. contained columbium, f.o.b. Niagara Falls, N. Y., ton lots	\$2.25†
Ferrocobalt, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace carload and contract per net ton	\$142.50
Ferrocobalt, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract, per net ton	\$157.50
Ferrophosphorus, electric, or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with \$3 unitage, freight equalized with Rockdale, Tenn., per gross ton	\$58.50
Ferrophosphorus, electrolytic 23-26% in car lots, f.o.b. Monsanto (Siglo), Tenn., 24%, per gross ton, \$3 unitage, freight equalized with Nashville	\$75.00
Ferromolybdenum, per lb. Mo. f.o.b. furnace	95c.
Calcium molybdate, per lb. Mo. f.o.b. furnace	80c.
Molybdenum oxide briquettes 48-52% Mo. per lb. contained Mo. f.o.b. Langeloth, Pa.	80c.

\* Spot prices are \$5 per ton higher.  
† Spot prices are 10c. per lb. of contained element higher.

### \*ORES

#### Lake Superior Ores Delivered Lower Lake Ports

Per Gross Ton	
Old range, bessemer, 51.50%	\$5.25
Old range, non-bessemer, 51.50%	5.10
Mesaba, bessemer, 51.50%	5.10
Mesaba, non-bessemer, 51.50%	4.95
High phosphorus, 51.50%	4.85

#### Foreign Ores\*

C.i.f. Philadelphia or Baltimore, Exclusive of Duty

Per Unit	
Algerian, low P, Cu free, dry, 55 to 58% Fe	12c.
Swedish, low P, 68% Fe	12c.
Swedish, basic or foundry, 65% Fe	11c.
Caucasian, washed, 52% Mn	49c.
African, Indian, 44 to 48% Mn	46c.
African, Indian, 49 to 51% Mn	48c.
Brazilian, 46 to 48% Mn	46c.
Cuban, del'd, duty free, 51% Mn	61c.

#### Per Short Ton Unit

Tungsten, Chinese, Wolframite, duty paid, delivered	\$23.00 to \$24.00
Tungsten, domestic, scheelite delivered	23.00 to 25.00
Chrome ore, lump c.i.f. Atlantic Seaboard, per gross ton: South African (low grade)	\$19.00
Rhodesian, 45%	22.00
Rhodesian, 48%	26.00 to \$27.00
Turkish, 48-49%	27.00 to 28.00
Turkish, 45-46%	25.00 to 26.00
Turkish, 40-41%	22.00
Chrome concentrates c.i.f. Atlantic Seaboard, per gross ton: Turkish, 48-49%	\$27.00 to \$28.00

\* All foreign ore prices are nominal

### FLUORSPAR

Per Net Ton	
Domestic washed gravel, 85-5, f.o.b. Kentucky and Illinois mines, all rail	\$21.00
Domestic, f.o.b. Ohio River landing barges	21.00
No. 2 lump, 85-5, f.o.b. Kentucky and Ill. mines	\$20.00 to 22.00
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic ports, duty paid	\$25.00 to \$25.50
Domestic No. 1 ground bulk, 96 to 98%, calcium fluoride, not over 2 1/2% silicon, f.o.b. Illinois and Kentucky mines	\$31.00
ditto, in bags, f.o.b., same mines	\$32.60

### FUEL OIL

#### Per Gal.

No. 3, f.o.b. Bayonne, N. J.	5.10c.
No. 6, f.o.b. Bayonne, N. J.	3.57c.
No. 5 Bur. Stds., del'd Chicago	3.25c.
No. 6 Bur. Stds., del'd Chicago	2.75c.
No. 3 distillate, del'd Cleve'd	5.25c.
No. 4 industrial, del'd Cleve'd	5.00c.
No. 5 industrial, del'd Cleve'd	4.25c.
No. 6 industrial, del'd Cleve'd	3.875c.

### COKE

#### Per Net Ton

Furnace, f.o.b. Connells-ville, Prompt	\$4.00 to \$4.25
Foundry, f.o.b. Connells-ville, Prompt	5.25 to 5.50
Foundry, by - product Chicago ovens	10.50
Foundry, by - product del'd New England	12.50
Foundry, by - product del'd Newark or Jersey City	11.38 to 11.90
Foundry, by - product Philadelphia	11.13
Foundry, by - product delivered Cleveland	11.05
Foundry, by - product delivered Cincinnati	10.50
Foundry, Birmingham	7.50
Foundry, by - product del'd St. Louis industrial district	10.75 to 11.90
Foundry, from Birmingham, f.o.b. cars dock Pacific ports	14.75

## PERSONALS

(CONTINUED FROM PAGE 74)

WADE R. WEAVER, for the past two years chief inspector at the Cleveland works, Republic Steel Corp. has been named superintendent of the 40-in., 21-in., and 18-in. open hearth mills at Youngstown. Mr. Weaver was graduated in 1923 from Yale University, where he majored in metallurgical engineering. He began working at Corrigan-McKinney Steel Co. immediately after graduation and successively worked in the open hearth department, rolling mill and as assistant chief metallurgist.

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JOHN L. LOWE, formerly production metallurgist for Campbell, Wyant & Cannon Foundry Co. at Muskegon Heights, Mich., is now foundry manager for the Vilter Mfg. Co. at Milwaukee.

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P. S. WISWELL, who has been representing the Norton Co. and its Behr-Manning division, Worcester, Mass., on the Pacific Coast, will devote all of his time to the sale of Behr-Manning products. WARREN H. TURNER, heretofore field engineer for the Norton Co. in the Detroit area, has taken over the southern California territory, including Arizona and New Mexico, with headquarters in Los Angeles. E. G. PETHERICK, formerly grinding wheel specialist for C. W. Marwedel, Norton distributor in San Francisco, has joined the Norton organization and will cover northern California, including Nevada and Utah.

♦ ♦ ♦

H. A. FELDBRUSH, formerly general manager of the Carbondale division of Worthington Pump & Machinery Corp., Harrison, N. J., has been elected vice-president of the company. He will make his headquarters at Holyoke, Mass., where he will have charge of operations of that works. He joined the Worthington company in 1915 after his graduation in mechanical engineering from Washington University.

♦ ♦ ♦

FRED L. FOX has been appointed Chicago district manager of sales, with offices in the Peoples Gas Building, by the Superior Steel Corp., Pittsburgh.

♦ ♦ ♦

E. R. WAGNER, president; D. W. TIETJEN, plant superintendent; ALBERT WAGNER, foreman of the tool and

die shop, and HARRY CASSEBAUM, an employee of the E. R. Wagner Mfg. Co., Milwaukee, recently celebrated their 40th anniversary with the firm which began by taking over a department of the old C. J. Smith Co., forerunner of the present A. O. Smith Corp. Wagner products include automobile and carpet sweeper parts.

♦ ♦ ♦

W. S. ARTHUR, who resigned recently as manager of the Chicago office of the Superior Engine Co., has joined the Cooper-Bessemer Corp., Mt. Vernon, Ohio, as manager of its newly-established St. Louis office. He entered the heavy machinery industry in 1916 with the Foos Engine Co. Two years later he joined the sales staff of the Worthington Pump & Machinery Co. and in 1927 entered the pump business as president of the Ohio Pump & Supply Co. He joined the Superior Engine Co. in 1931.

♦ ♦ ♦

E. K. ANDERSON, who has been identified with Cutler-Hammer, Inc., Milwaukee, for a number of years, has been made manager of the company's branch office at Dallas, Tex.

♦ ♦ ♦

ROBERT W. LEA, vice-president in charge of finance of Johns-Manville Corp., New York, has been elected a director.

♦ ♦ ♦

CARL HILDEBRAND, president, Sandvik Steel, Inc., Sandviken, Sweden, is scheduled to sail for that country on March 9.

♦ ♦ ♦

JOHN T. MCENROE, of the company of the same name, Chicago, has been named the representative of the Institute of Scrap Iron and Steel, Inc., on the standing committee of the Bureau

of Standards, Department of Commerce, which periodically reviews the standard specifications for scrap.

♦ ♦ ♦

MARK A. GARDNER has been appointed sales manager of Wasmer Bolt & Nut Co., Cleveland. For 17 years he served the W. Bingham Co., Cleveland hardware jobber, and for the past 11 years was steel buyer there.

♦ ♦ ♦

W. HOMER HARTZ has been elected a director of A. M. Castle & Co. to succeed the late James Simpson. Mr. Hartz is president of the Morden Frog & Crossing Works, Chicago Heights, and the Illinois Manufacturers' Association.

## Central Tube Co. Is Liquidating

PITTSBURGH—Spang Chalfant, Inc., affiliate of National Supply Co., manufacturer of butt weld, lap weld and seamless tubular products, will service the pipe stock accounts of the Central Tube Co., Pittsburgh, which early this week announced its decision to liquidate its business. Central Tube has contracted to dispose of its plant and inventories at Ambridge, Pa., but at the present time no information is available as to details covering that phase of the liquidation. Latest reports on Central Tube Co. showed products and annual capacities as follows: 171,400 tons of butt weld; 64,700 tons of lap weld, 75,000 tons of galvanized pipe and 45,000 tons of conduit. The company had four butt weld furnaces for pipe, 1/4 in. to 3 in.; one lap weld furnace for pipe, 2 in. to 13 3/4 in., and two galvanizing pots.

Alex Laughlin is chairman of Central Tube Co., W. F. Ingalls, president, and H. G. Morrow, vice-president of sales.

Spang Chalfant, Inc., has an annual capacity of 300,000 tons of seamless tubes from 1 1/4 to 14 in. at its Ambridge, Pa., plant. At its Etna, Pa., works, an annual capacity of 220,000 tons of pipe includes 100,000 tons of butt weld, sizes 1/8 to 3 in., and 120,000 tons of lap weld pipe, sizes from 2 to 24 in., and an annual capacity of 40,000 tons of galvanized pipe. Spang Chalfant has practically completed an additional patented process continuous weld pipe mill which will manufacture butt weld pipe up to 4 in. in diameter. The company placed its first continuous butt weld pipe mill in operation in 1938.

### Institute Reports To Be In Net Tons Henceforth

THE American Iron and Steel Institute will henceforth report all production and capacity figures in net tons instead of gross tons. This applies even to semi-finished steel, pig iron and rails, which are sold on a gross ton basis. Institute statisticians will have to make about 20,000 computations to change previous figures, which are in gross tons, to net tons.



## REINFORCING STEEL

... Awards of 2900 tons; 4355 tons in new projects

### AWARDS

#### ATLANTIC STATES

- 1200 Tons, Washington, War Department building, to Sweets Steel Co., Williamsport, Pa.  
100 Tons, Boston, Brighton district, hospital, to Concrete Steel Co., Boston.

#### SOUTH AND CENTRAL

- 360 Tons, State of Oklahoma, highway work, to Sheffield Steel Corp., Kansas City.  
250 Tons, Hammond, Ind., pumping plant, to W. J. Holliday & Co., Hammond.  
200 Tons, St. Louis, retail store for Lerner's Stores Corp., through Fruin-Coloon Construction Co., to Laclede Steel Co., St. Louis.  
168 Tons, Toledo, Ohio, State project No. 283, Ottawa River bridge, to Truscon Steel Co., Youngstown.  
100 Tons, Charleston, W. Va., Atlas office building, to Bethlehem Steel Co., Bethlehem, Pa.

#### WESTERN STATES

- 245 Tons, Sunnyvale, Cal., hangar and laboratory at Moffett Field, to Soule Steel Co., San Francisco, through James I. Barnes, Santa Monica, Cal., contractor.  
220 Tons, Yountville, Cal., veterans' barracks, to Soule Steel Co., San Francisco, through James I. Barnes, Santa Monica, Cal., contractor.

### PENDING REINFORCING BAR PROJECTS

#### ATLANTIC STATES

- 1150 Tons, New York, midtown highway tunnel plaza to Gail Avenue.  
175 Tons, Brooklyn, addition for Sears-Roebuck & Co.  
125 Tons, New York, Delaware Aqueduct contract No. 343, Board of Water Supply; bids due Feb. 28.  
100 Tons, Yonkers, N. Y., Saw Mill River Parkway, for Westchester County Park Commission.

#### SOUTH AND CENTRAL

- 1200 Tons, Carrville, La., U. S. hospital; bids March 1.  
550 Tons, Ola, Ark., dam; bids taken.  
400 Tons, Chicago, addition to customs house; bids in.  
250 Tons, Chicago, building for W. F. Ritchie Co., bids March 2.  
200 Tons, Genoa, Wis., generating plant, Tri-State Power Co.  
100 Tons, Detroit, Schmidt bottling works.

#### WESTERN STATES

- 105 Tons, San Francisco, Safeway Stores meat plant; general contract award under advisement.

## CAST IRON PIPE

Marlboro, Mass., has awarded a tonnage of 8-in. pipe to Warren Foundry & Pipe Corp. Niagara Falls, N. Y., plans pipe line extensions in water system in different parts of city. Cost about \$85,000. Financing is being arranged through Federal aid. H. W. Clark, City Hall, is city engineer.

Wheatridge Water District, Wheatridge, Colo., now being organized by Arthur J. Apel, Wheatridge, and associates, plans pipe lines for water system in district. Cost close to \$75,000.

Purchasing Agent, Bureau of Reclamation, Denver, asks bids until March 6 for cast iron water pipe; also for soil pipe, galvanized pipe, fittings, etc. (Circular 33430-A).

Columbus, Neb., plans early purchase of about one carload of pipe for extensions in water system. Financing is being arranged through Federal aid. C. H. Whitaker is water commissioner in charge.

Fuquay Springs, N. C., plans water pipe line system and other waterworks installation. Bond issue of about \$33,000 will be arranged soon for this and sewage system.

Hurley, Wis., has authorized surveys and estimates of cost for water pipe line system and other waterworks installation. Herbert

Moore, 904 South Layton Boulevard, Milwaukee, is engineer.

Public Works Officer, Naval Station, Mare Island, Cal., asks bids until March 6 for pipe lines for fresh and salt water distribution system; also pipe lines for steam and compressed air distribution systems (Specifications 9622).

Quinlan, Tex., plans pipe lines for water system and other waterworks installation, including elevated steel tank and tower. Cost about \$50,000. Financing has been arranged through bond issue and Federal aid.

General Purchasing Agent, Panama Canal, Washington, asks bids until March 7 for 6000 ft. of cast iron water pipe (Schedule 3915).

Unadilla, N. Y., plans 6 and 8-in. pipe for extensions in water system. Cost about \$25,000. Bond issue is being arranged.

Preble, Brown County, Wis., is contemplating 5665 ft. of 18-in. sewer pipe from Bay Beach pavilion to sewage treatment plant, as WPA project. H. R. Albert, Court House, Green Bay, Wis., is engineer.

Marshfield, Wis., Water and Light Commission closed bids March 1 on 3800 ft. of 6-in. cast iron pipe, six 6-in. valves, six 6-in. boxes, one 6-in. cut-in tee, two 6-in. crosses, four 6-in. plugs, two 6-in. sleeves, one 6-in. tee; 700 ft. of 2-in. cast iron pipe, nine 2-in. tees, nine 2-in. plugs, one 2-in. cross. R. F. Cramer is secretary of commission.

## ... PIPE LINES ...

Stanolind Pipe Line Co., Philcade Building, Tulsa, Okla., plans new welded steel pipe line from oil field district at Byars, McClain County, Okla., to connection with main pumping station at Pauls Valley, Garvin County, Okla., about 13 miles, for crude oil transmission.

Texas Cities Gas Co., Galveston, Tex., plans pressure pipe line extensions in gas transmission and distribution systems in mainland districts, including steel pipe line across Galveston Bay. Appropriation of about \$130,000 is being arranged, part of fund to be used for new service lines and connections, meters and other facilities.

Chief Clerk, Medical Center for Federal Prisoners, Springfield, Mo., asks bids until March 4 for steel pipe (Circular 135).

Standard Oil Co. of Ohio, Midland Building, Cleveland, plans construction of new 12-in. welded steel pipe line from Stoy, Ill., to Lima, Ohio, about 260 miles, for gasoline transmission. Contract for installation has been let to Sheehan Pipe Line Construction Co., Tulsa, Okla., and Truman & Smith Co., El Dorado, Ark.

Construction Quartermaster, Lowry Field, Colo., asks bids until March 12 for construction and completion of pressure pipe line system for steam distribution.

Lawrence Pipe Line Co., Lawrenceville, Ill., recently organized as an interest of Texas Co., 135 East Forty-second Street, New York, plans new 6-in. welded steel pipe line from oil refinery of parent company at Lawrenceville to Evansville, Ind., close to 60 miles, for gasoline transmission. Large bulk terminal will be located on Ohio River at latter place, with barge loading facilities for transportation of gasoline to different points on river. Project will include booster pumping stations and other operating facilities.

McAllen, Tex., will take bids early in April for pipe lines for natural gas distribution, comprising about 10,500 ft. of 4, 3 and 2-in., with control station, meters and other operating facilities. Garrett Engineering Co., 918 Richmond Road, Houston, Tex., is consulting engineer.

United States Engineer Office, Jacksonville, Fla., closes bids March 4 for 100 pieces of steel shore pipe, 20-in. inside diameter, formed of 3/16-in. steel plate, each piece 16 ft. long (Circular 417).

Gulf Plains Corp., Jones Building, Corpus Christi, Tex., plans pressure pipe line gathering system in gas field area near Agua Dulce and Stratton fields, Nueces County, Tex., for natural gas supply for new recycling plant in course of construction at Agua Dulce, about 22 miles in all. Booster stations will

be installed. Main welded steel pipe line will be constructed from gathering lines terminal to plant site. Contract has been let to John Camp Drilling Co., National Bank of Commerce Building, San Antonio, Tex., for drilling about 20 wells in gas field noted.

## SWOC Dues Collectors Close McKeesport Tin Plate Plant; Company Has Union Contract

PITTSBURGH—The McKeesport Tin Plate Co. was forced to shut down its plant at Port Vue, Pa., early this week when SWOC dues pickets prevented several hundred employees, who did not have paid-up dues cards, from entering the plant. Company officials stated the plant would be shut down indefinitely and late Tuesday of this week no information was available as to when operations would be resumed. The company has a contract with the SWOC.

Although deputy sheriffs were on hand to prevent violence, no action was taken by county and city officials when the pickets blocked a public highway, as well as a public street bridge. Motorists and others were stopped and, if no paid up dues card was forthcoming, they were turned away. Foremen, office employees and women were permitted to enter the plant but later in the day on which the company shut down, pickets had barred many of the maintenance workers from entering.

Officials of McKeesport Tin Plate had no comment to make other than that the plant was shutting down because of inability to operate. International headquarters of the SWOC classified the incident as a "local" affair. The company had permitted the union to collect dues 100 ft. from a pay window. Officials indicated that the employees could have gone to work if protected.

## Supreme Court Upholds Steckel Patents' Validity

WASHINGTON—In denying a petition for a writ of certiorari asked by the Carnegie-Illinois Steel Corp., the United States Supreme Court on Monday affirmed a decision of June 1, 1939, by the Circuit Court of Appeals at Philadelphia, upholding the validity of two Steckel patents assigned to the Cold Metal Process Co., Youngstown, Ohio. One patent involved a method for cold rolling thin sheets and the other for metal rolling. (Details of the decision by the Circuit Court of Appeals were published in THE IRON AGE of June 22, 1939, page 78-F.)



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# PLANT EXPANSION AND EQUIPMENT BUYING

## ◀ NORTH ATLANTIC ▶

**Joseph E. Seagram & Sons, Inc.**, 405 Lexington Avenue, New York, has let general contract to J. A. Utley, 720 East Ten-Mile Road, Royal Oak, Detroit, for two-story and basement addition, 40 x 135 ft., to branch distillery at Louisville, and improvements in present cistern building. Cost over \$60,000 with equipment. Smith, Hinchman & Grylls, Marquette Building, Detroit, are architects.

**Department of Public Works, Municipal Airport, Municipal Building, New York**, is securing appropriation of \$1,620,000 through budget authorized by City Council for new steel hangar at LaGuardia Field, to cost \$1,350,000 with shop and mechanical facilities. Remainder of fund, \$270,000, will be used for school for airplane mechanics at field.

**Commanding Officer, Ordnance Department, Watervliet Arsenal, Watervliet, N. Y.**, asks bids until March 12 for spare parts for 60 mm. motor and mortar mounts (Circular 459), air-conditioning equipment (Circular 461).

**C. N. Burman Co.**, 10 West Twentieth Street, New York, lamps, lighting fixtures, etc., has purchased former textile mill of Johnson-Cowdin Mills, 785-821 River Street, Paterson, N. J., comprising eight buildings totaling 128,000 sq. ft. of floor space, and will remodel for main plant. Company is now operating five plants in different parts of country, all of which will be concentrated at new location, where additional facilities will be provided. Cost over \$65,000. Plant is scheduled to be ready for service in May.

**Board of Water Supply**, 346 Broadway, New York, Richard H. Burke, Jr., secretary, asks bids until March 5 for sluice gates, gate valves, plug valves, wall castings, bronze extension stems and other steel, cast iron and bronze specialties for Delaware aqueduct (Contract 350).

**Brewster Aeronautical Corp.**, 34-01 Thirty-eighth Street, Long Island City, has leased municipal hangar at Newark Airport, Newark, N. J., about 150,000 sq. ft. of floor space, recently referred to, and will convert at once for new branch plant, largely for production of military aircraft, parts manufacture and assembling. Option also has been taken on 10-acre tract adjoining hangar, to be used later for new one-story branch plant, with stipulation that initial units will cost not less than \$250,000. Present plant at first noted address will be continued in operation for time being.

**Utica-Willowvale Bleaching Co.**, State Street, Utica, N. Y., has let general contract to H. R. Beebe, Inc., Court Street, for new power house at Willowvale, N. Y., mill, 45 x 70 ft. Cost over \$50,000 with equipment. Lockwood Greene Engineers, Inc., 10 Rockefeller Plaza, New York, is consulting engineer.

**Flintkote Co.**, 50 West Fiftieth Street, New York, roll roofing, etc., has purchased tract near Meridian, Miss., for new branch mill for production of insulating board and allied specialties. Processing and other machinery will be installed, with power house, machine shop and other mechanical departments. Work will begin in March. Cost over \$1,500,000 with equipment, of which close to \$1,000,000 will represent machinery purchases.

**Board of Education, Weehawken, N. J.**, Lester L. Davis, secretary, asks bids until March 5 for shop machinery (Contract No. 42), and general shop equipment (Contract No. 41) for high school on Liberty Place. Fanning & Shaw, 49 Ward Street, Paterson, N. J., are consulting architects.

**C. T. Williamson Wire Novelty Co.**, 52 Badger Avenue, Newark, N. J., plans rebuilding part of plant recently destroyed by fire. Loss about \$50,000 with equipment.

**General Aniline Works, Inc.**, 435 Hudson Street, New York, has let general contract to

Wilhelms Construction Co., 119 Division Street, Elizabeth, N. J., for addition to power house at Grasselli, N. J. Cost close to \$40,000 with boiler unit and auxiliary equipment.

**Camden Copper Works**, 559 South Second Street, Camden, N. J., has let general contract to H. John Homan, Inc., 446 Haddon Avenue, Collingswood, N. J., for one-story addition. Cost about \$40,000 with equipment. Neutze & McNally, 39 South Sixth Street, Camden, are architects.

**Midvale Co.**, Wissahickon Avenue, Nicetown, Philadelphia, steel castings, forgings, etc., affiliated with Baldwin Locomotive Works, Inc., Eddystone, Pa., has asked bids on general contract for one-story addition. Cost close to \$50,000 with equipment.

## ◀ BUFFALO DISTRICT ▶

**Aluminum Co. of America, Inc.**, Gulf Building, Pittsburgh, has plans for one-story addition to branch mill at Massena, N. Y. Cost over \$75,000 with equipment.

**Washburn Crosby Co.**, Marine Trust Building, Buffalo, flour, cereals, etc., a unit of General Mills, Inc., plans rebuilding part of mill on South Michigan Street, forming part of new plant recently completed, destroyed by fire, Feb. 15, with loss about \$650,000 including equipment.

**Hewitt Rubber Co.**, 240 Kensington Avenue, Buffalo, mechanical rubber products, has let general contract to John W. Cowper Co., Sidway Building, for four-story and basement addition. Cost close to \$85,000 with equipment. H. E. Plummer & Associates, Inc., 775 Main Street, is consulting engineer.

## ◀ NEW ENGLAND ▶

**Hamilton Standard Propeller Division, United Aircraft Corp.**, South Main Street, East Hartford, Conn., has let general contract to R. G. Bent, 93 Edwards Street, Hartford, for one and two-story addition, L-shaped, 66 x 160 ft., and 80 x 250 ft. respectively. Cost about \$150,000 with equipment. Pratt & Whitney Division, same address, has taken out permit for one-story addition, 22 x 80 ft., for a waterbrake test shop. Erection contract has been awarded to same contractor.

**Public Works Officer, Building 39, Navy Yard, Boston**, asks bids (no closing date stated) for new double steel hangar at Naval Air Station, Squantum, Mass. (Specifications 9556).

**Brighton Dressed Beef & Veal Co.**, 4 Abat-tor Grounds, Brighton, Boston, will take bids soon on revised plans for one and two-story rendering plant at Somerville, Mass. Cost about \$150,000 with equipment. Morris Fruchtbaum, 400 Chestnut Street, Philadelphia, is engineer.

**New England Aircraft School, Inc.**, 29 Brookline Avenue, Boston, plans new two-story aviation mechanics' school, 90 x 160 ft., on Maverick Street Extension, East Boston. Cost about \$85,000 with equipment. Kendall, Taylor & Co., 221 Columbus Avenue, Boston, are architects.

## ◀ WASHINGTON DIST. ▶

**Assistant Director of Prisons, Department of Justice, Washington**, asks bids until March 5 for standard anchors, lead anchors, drills, nuts, cotter pins, tool holders, rivets, screws, bolts, lock washers, expansion shields and other equipment for Danbury, Conn. (Circular 2240).

**Bureau of Supplies and Accounts, Navy Department, Washington**, asks bids until March 5 for 18,000 16-in. powder containers (powder tanks), without wrenches (Schedule 788) for Eastern yards; 42,800 CO<sub>2</sub> gas-filled cylinders (Schedule 768) for San Diego Naval Air Station; 47,152 ammunition boxes (Schedule 799) for Portsmouth, N. H., and Mare Island yards.

**Northern Virginia Power Co.**, Winchester, Va., is arranging fund of \$200,000 for expansion and improvements in power station, transmission and distributing lines and other facilities.

**Public Works Officer, Navy Yard, Norfolk, Va.**, has let general contract to R. R. Richardson & Co., Bank of Commerce Building, for one-story aircraft storehouse at naval operating base, Norfolk, at \$80,380 exclusive of equipment (Specifications 9600).

**Virginia Electric & Power Co.**, Richmond, Va., is arranging appropriation of about \$3,675,000 for expansion and improvements, of which close to \$1,000,000 will be used for steam-electric generating plant on Twelfth Street, on which work is now under way, as well as for new hydroelectric generating station on Kanawha Canal; approximately \$930,000 will be used for transmission line extensions and power substations, and \$300,000 for additional service facilities in different districts.

**Bureau of Yards and Docks, Navy Department, Washington**, has asked bids for one-story addition to machine shop at Philadelphia Navy Yard (Specifications 9404). Commanding office, Building No. 1 at Navy Yard, is in charge.

## ◀ SOUTH ATLANTIC ▶

**Filtered Rosin Products, Inc.**, Brunswick, Ga., plans new plant on 10-acre tract on Jessup Highway, near Baxley, Ga., consisting of three one-story production units, with processing and auxiliary machinery, mechanical shop, power house and other structures. Cost over \$75,000 with equipment.

**LaGrange Coca-Cola Bottling Co.**, LaGrange, Ga., has let general contract to Daniel Lumber Co., LaGrange, for two-story mechanical-bottling, storage and distributing plant. Cost about \$70,000 with equipment. Odie C. Poundstone, Palmer Building, Atlanta, Ga., is architect.

## ◀ SOUTH CENTRAL ▶

**Louisville Gas & Electric Co.**, Louisville, has authorized plans for addition to local steam-electric power plant, to include installation of new 25,000-kw. turbine-generator unit, high-pressure boilers and auxiliary equipment, work to begin in May. Cost over \$2,200,000 with equipment. This is part of 1940 expansion program. Public Utility Engineering & Service Corp., 231 South La Salle Street, Chicago, is consulting engineer.

**Tennessee Valley Paper Mills, Inc.**, 720 Market Street, Knoxville, Tenn., recently organized, has let general contract to Merritt-Chapman & Scott Corp., 17 Battery Place, New York, for new pulp and paper mill for newsprint production, near Savannah, Tenn. It will include power house, power substation, storage and distributing buildings, machine shop and other mechanical structures. Contract has been made with TVA for electric power supply. Cost about \$4,000,000 with machinery. Company has arranged financing in gross amount of \$6,000,000 through RFC and sale of stock, remainder of fund to be used for development of timber properties near mill for raw material supply, with saw mills and other logging structures, and for general operations. Gordon Browning, former Governor of Tennessee, is president. Hardy S. Ferguson & Co., 200 Fifth Avenue, New York, are consulting engineers.

## ◀ SOUTHWEST ▶

**Board of Public Works, City Hall, Kansas City, Mo.**, Ralph C. Cameron, director, plans new hangar, 200 x 600 ft., at municipal airport, with repair and reconditioning facilities. Cost about \$75,000 with equipment.

**McDonnell Aircraft Corp.**, Lambert-St. Louis municipal airport, St. Louis, has purchased plant now occupied by Monocoupe Corp., at local airport, with total of 36,000 sq. ft. of floor space, for new plant unit for production of military aircraft, including parts manufacture and assembling. Monocoupe company will vacate property March 31 and will remove to another location, soon to be determined, where increased facilities will



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be provided. J. S. McDonnell, formerly engineer for Glenn L. Martin Co., Baltimore, is president of first noted company.

**Clerk, Medical Center for Federal Prisoners,** Springfield, Mo., asks bids until March 4 for pipe caps, nipples, locknuts, armored cable, lighting and power wire, pipe straps, pipe sleeves, valves, unions, pipe hangers, switches, fuses, floor plates, etc., and two gas-fired boilers (Circular 135).

**Standard Rendering Co.,** 635 Adams Street, Kansas City, Kan., has let general contract to Weeks Construction Co., 2000 Washington Street, for three-story addition, 60 x 70 ft. Cost about \$60,000 with equipment. M. H. Doyme, Railway Exchange Building, St. Louis, is consulting engineer.

**Collins-Davoust Paint Mfg. Co.,** 941 Terminal Street, Dallas, Tex., plans new one and two-story plant, 80 x 120 ft. Cost close to \$50,000 with equipment.

**Manor Baking Co.,** 4050 Penn Street, Kansas City, Mo., an interest of Campbell-Taggart Associated Bakeries, Inc., same address, has approved plans for one-story branch baking, storage and distributing plant at Dallas, Tex. Cost about \$200,000 with ovens, conveyors, mixers, loaders and other mechanical equipment. Boillot & Lauck, 1012 Baltimore Avenue, Kansas City, are architects; Walter Sharp, Construction Building, Dallas, is associate architect.

## ◀ WESTERN PA. DIST. ▶

**Corry-Jamestown Mfg. Co.,** West Main Street, Corry, Pa., metal office furniture, cabinets, steel shelving, etc., has let contract to Rogers Structural Steel Co., 26 West Earle Street, for structural steel for one-story addition, 70 x 110 ft. Cost about \$50,000 with equipment.

**West Penn Power Co.,** West Penn Building, Pittsburgh, is arranging financing in amount of about \$5,000,000 to be used as part of authorized appropriation of about \$7,600,000 for expansion and improvements in plants and system. Work will include expansion at Windsor, W. Va., generating station, with installation of new 60,000-kw. turbine-generator unit and accessories; transmission and distributing lines, power substations, service facilities and other work.

**Aluminum Co. of America, Inc.,** Gulf Building, Pittsburgh, has plans for two two-story and basement additions to branch plant at New Kensington, Pa., for metallurgical laboratory and other technical departments. Cost close to \$100,000 with equipment.

## ◀ OHIO AND INDIANA ▶

**Procter & Gamble Co.,** Gwynne Building, Cincinnati, plans new branch plant at Dallas, Tex., for soap-manufacturing division, with power house, mechanical shops and other structures. Cost close to \$1,000,000 with machinery. Company is now operating a branch works at 1226 Loomis Street, Dallas, which will be continued as heretofore.

**Industrial Rayon Corp.,** West Ninety-eighth Street and Walford Avenue, Cleveland, plans expansion at branch mill near Painesville, Ohio, to increase present output about 50 per cent. Cost close to \$4,000,000 with machinery. Wilbur Watson & Associates, 4614 Prospect Avenue, Cleveland, are architects and engineers.

**Marsh Wall Products, Inc.,** New Philadelphia, Ohio, building materials, has purchased former plant of Cook & Genung Co., 74-96 Woolsey Street, Irvington, N. J., and will modernize for new factory branch, storage and distributing plant. Executive offices are at Dover, Ohio.

**Contracting Officer, Materiel Division, Air Corps, Wright Field, Dayton, Ohio,** asks bids until March 4 for 29 buffers and polishers, four bench-type buffers and polishers, 17 bench-type grinders, 151 pedestal-type grinders, 24 grinders, eight pedestal-type disk grinders, six drill grinders, two pedestal-type drill grinders, 15 flexible shaft grinders, 16 tool post grinders, all motor-driven (Circular 1073), five motor-driven brake drum lathes, with grinding attachment (Circular 1081); until March 5, two airplane tail hydraulic

jacks (Circular 1095); until March 12, two fuel-serving dollies (Circular 1098).

**Board of Public Works, Huntington, Ind.,** ask bids until March 7 for following equipment for expansion in municipal power plant and waterworks station: One 300-kw. diesel engine-generator unit and accessories, starting air equipment, cooling tower and heat transfer units, fuel pumps and storage tanks, two centrifugal pumps of 700 and 350-gal. per min. rating, respectively, and two cooling system pumps, switchboard, etc. Lennox & Matthews, Architects' & Builders' Building, Indianapolis, are consulting engineers.

## ◀ MIDDLE WEST ▶

**Wood River Oil & Refining Co.,** Hartford, Ill., has let general contract to Winkler-Koch Engineering Co., 335 West Lewis Street, Wichita, Kan., for new local oil refinery to handle about 5000-bbl. of crude oil per day, power house, steel tank storage department, and other structures. Cost about \$500,000 with equipment.

**Illinois Soy Products Co.,** Springfield, Ill., soya bean oils, etc., plans rebuilding part of mill recently destroyed by fire. Loss about \$150,000 with equipment.

**General Electric Co.,** 230 South Clark Street, Chicago, has filed plans for eight-story factory branch, storage and distributing plant, 210 x 259 ft., at 840 Canal Street, for which general contract recently was let to James Stewart Corp., 343 South Dearborn Street. Cost over \$1,300,000 with equipment.

**Tri-State Power Co-operative, Inc.,** Rivoli Building, La Crosse, Wis., is arranging call for bids for new electric generating plant near Genoa, Wis., for power supply for rural electric system. Fund of \$1,500,000 has been arranged through Federal aid for this and rural electric lines. A. Y. Taylor & Co., Central Building, Clayton, Mo., are consulting engineers.

**Math-Barzen Co.,** Thief River Falls, Minn., plans rebuilding grain mill and elevator, recently destroyed by fire. Loss about \$200,000 with elevating, screening, conveying and other mechanical equipment.

**John Deere Tractor Co.,** Waterloo, Iowa, agricultural machinery and parts, plans two-story and basement addition, in part for experimental division. Cost over \$50,000 with equipment.

**Clonick Steel Co.,** 1475 South State Street, Chicago, steel products, has asked bids on general contract for one-story addition to plant at Twenty-fourth and Archer Streets. Cost about \$45,000 with mechanical-handling and other equipment. Loeb & Schlossman, 333 North Michigan Avenue, are architects.

## ◀ MICHIGAN DISTRICT ▶

**Industrial Wire Cloth Products Co.,** 29274 Brush Street, Wayne, Mich., perforated metal products, has let general contract to Bert T. Haberkorn, 2658 Porter Street, Detroit, for one-story addition, 50 x 155 ft. Cost over \$60,000 with equipment. H. Augustus O'Dell, Marquette Building, Detroit, is architect.

**A. C. Spark Plug Division, General Motors Corp.,** Flint, Mich., plans one-story addition totaling about 156,000 sq. ft. of floor space. Cost over \$500,000 with equipment. Buick Division, Flint, has work under way on two one-story additions, totaling 180,000 sq. ft. of floor space, for expansion in axle department and sheet metal works. Cost close to same amount noted.

**Stubnitz-Greene Spring Corp.,** Adrian, Mich., plans power house at local plant. Cost close to \$40,000 with boilers and auxiliary equipment.

## ◀ PACIFIC COAST ▶

**Holly Sugar Co.,** Dyer Road, Santa Ana, Cal., has awarded general contract to Markel Brothers, 611 McFadden Street, for one-story addition to beet sugar mill, 200 x 400 ft., for a water reclaimer and clarifying unit. Cost over \$75,000 with equipment. Main offices are at Colorado Springs, Colo.

**Twentieth Century Fox Film Corp.,** 10201 West Pico Boulevard, Los Angeles, has let

general contract to E. S. McKittrick Co., 5905 Pacific Boulevard, Huntington Park, Cal., for one-story addition, 120 x 250 ft., for a mechanical shop, storage and distribution. Cost over \$70,000 with equipment.

**Department of Public Service, 174 South Magnolia Boulevard, Burbank, Cal.,** H. I. Stites, city manager, asks bids until March 5 for two forced-draft and two induced-draft fans, with motors and auxiliaries, for municipal steam-electric generating station (Specifications 205).

**Coca-Cola Bottling Co.,** Stockton Boulevard and Miller Way, Sacramento, Cal., plans one-story addition for increase in mechanical bottling, storage and distributing departments. Cost over \$50,000 with equipment. E. D. Francis, Native Sons' Building, is architect.

**Bureau of Supplies and Accounts, Navy Department, Washington,** asks bids until March 5 for one woodworking lathe, 24-in. swing (Schedule 785), wood-turning lathe (Schedule 791), both motor-driven, for Mare Island Navy Yard; until March 8, spare parts for airplanes (Schedule 900-3095) for San Diego Naval Air Station.

**Burbank Unified School District, Burbank, Cal.,** has let general contract to Cummins & Chivens, 145 East San Fernando Road, for one-story and mezzanine floor vocational shop, 58 x 144 ft., at Burroughs Junior High School, at \$34,467 exclusive of equipment. Installation will include metal-working, wood-working, printing and other mechanical shop units. John C. Austin, Chamber of Commerce Building, Los Angeles, is architect.

**National Advisory Committee for Aeronautics, Langley Field, Hampton, Va.,** will ask bids soon on general contract for two-story mechanical shop, 106 x 246 ft., at Moffett Field, Sunnyvale, Cal.

## ◀ CANADA ▶

**Industrial Electric Products, Ltd.,** 201 Weston Road, Toronto, is having plans prepared by Benjamin Swartz, 130 Queen Street West, for factory addition, for which tenders will be called immediately.

**International Business Machines Co.,** 643 Craig Street West, Montreal, will erect new four-story building on old site at 1119 Beaver Hall Hill, 25 x 100 ft., to cost \$50,000. Louis Donolo, 630 Dorchester Street, is general contractor; C. R. Tetley, 630 Dorchester Street West, is architect.

**Jackson Oil Burner Co., Ltd.,** 50 Cedar Street, Sudbury, Ont., D. M. S. Hawke, head, plans one-story factory for production of oil burners and parts. Cost about \$45,000 with equipment.

**Barrett Co., Ltd.,** 5551 St. Hubert Street, Montreal, will start work at once on plant addition at Joliette, Que. Equipment purchases include paper making machinery, boiler and transmission equipment. G. E. Bradle is Joliette manager.

**Canada Wire & Cable Co., Ltd.,** Leaside, Ont., has awarded general contract to R. J. Hibbs Construction Co., Ltd., 15 Trent Avenue, Toronto, for one-story addition, 50 x 100 ft. Baines & David, Ltd., 54 Commissioner Street, Toronto, has reinforcing steel contract, and Dominion Bridge Co., Ltd., Toronto, structural steel contract.

**Canadian Carborundum Co., Ltd.,** Niagara Falls, Ont., has awarded general contract to R. Timms Construction Co., 221 Bargar Street, Welland, Ont., for two-story addition, 48 x 55 ft.

**Canadian General Electric Co., Ltd.,** Peterborough, Ont., has awarded general contract to A. W. Robertson, Ltd., 57 Bloor Street West, Toronto, for \$75,000 factory addition.

**Consumers Gas Co., Ltd.,** 19 Toronto Street, Toronto, has let contract to Walter Davidson, 188 Duke Street, for one-story machine shop addition, 36 x 100 ft. Charles B. Dolphin, 43 Victoria Street, is architect.

**New Brunswick Power Commission, St. John, N. B.,** plans coal generating power plant expansion at Grand Lake in central New Brunswick. A new 7500-hp. plant will be installed and 23 miles of transmission lines will be built at a total cost of about \$400,000. Enlargement is necessary to meet increase in power demand due to war needs.

# NEW SOUTH BEND 10-INCH LATHE

1 - Inch Collet Capacity . . .

1 $\frac{3}{8}$  - Inch Hole Through Spindle

50 to 1400 R.P.M. Spindle Speeds

Screw Threads 4 to 224 Per Inch

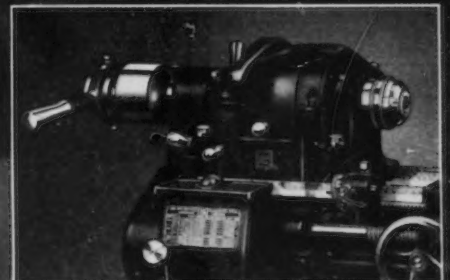
Power Cross Feed

Power Long. Feed



PATENT APPLIED FOR

1-inch Collet Capacity 10-inch Swing  
South Bend Underneath Belt Motor  
Drive Quick Change Gear Tool Room  
Precision Lathe. Mounted on all steel  
welded bench.  $\frac{1}{2}$  H.P. instant reversing  
ball bearing motor and 12-speed  
drive are enclosed in left side of bench.



#### Hand Lever Draw-in Collet Chuck

For Rapid Production of small interchangeable parts. Permits releasing and feeding bar stock through collet without stopping lathe spindle. Maximum collet capacity 1".



#### Hand Wheel Draw-in Collet Chuck

For Precision work in the Tool Room, Experimental Department, and Laboratory Shop. Maximum collet capacity 1".

**T**HIS new 10-inch swing 1-inch collet capacity back-geared, screw cutting precision lathe has the time saving features of an engine lathe combined with the sensitivity and accuracy of a fine precision collet lathe. It is capable of the most exacting tool and instrument work, and has the power and rigidity for taking heavy cuts on high speed production operations.

**Manufacturing** attachments available include hand lever draw-in collet chuck, semi-automatic hand lever bed turret, double tool rest, automatic carriage stop, four-way tool post, oil pan, oil pump and piping.

**Tool Room** attachments as illustrated include hand wheel draw-in collet chuck, telescopic taper attachment, micrometer carriage stop, thread dial indicator, and collet rack.

Immediate Delivery can be made on all popular sizes of South Bend Lathes from dealer display stocks in principal cities, a few of which are listed at right.

#### ON DISPLAY IN ALL PRINCIPAL CITIES

Boston, Mass. — MacKenzie Mach. Co.  
Bridgeport, Conn. — A. C. Bisgood  
Chicago, Ill. — C. B. Burns Mach. Co.  
Cleveland, Ohio — Reynolds Mach. Co.  
Detroit, Mich. — Lee Machinery Company  
Houston, Tex. — Wessendorff, Nelms & Co.  
Los Angeles, Cal. — Eccles & Davies  
Milwaukee, Wis. — W. A. Voell Mach. Co.  
Newark, N. J. — J. R. Edwards Mach. Co.  
New York, N. Y. — A. C. Colby Mach. Co.  
Philadelphia, Pa. — W. B. Rapp, Mach.  
Providence, R. I. — Geo. T. Reynolds & Son  
San Francisco, Cal. — Moore Mach. Co.  
Seattle, Wash. — Star Machinery Co.  
Toronto — A. R. Williams Mach. Co., Ltd.

## SOUTH BEND LATHE WORKS

LATHE BUILDERS SINCE 1906

595 E. Madison St., South Bend, Ind., U.S.A.





# THIS WEEK'S MACHINE ... TOOL ACTIVITIES ...

*... Airplane industry's requirements and continuance of foreign buying hold volume of orders at fairly high level ... Milwaukee Road issues inquiry for 25 tools.*

## Buying Pace Slackens, But Inquiries at High Level

NEW YORK—There has been a perceptible let-up in machine tool buying in the metropolitan area in the past fortnight, but inquiries are at a higher level than before and the outlook is still very promising. Heavy buying programs expected to be initiated by the principal aircraft engine builders have yet to materialize, although unfilled orders from this source still run into the millions of dollars. Meanwhile, some of the overflow work from the big plants is finding its way into the smaller contract shops which are picking up an occasional tool for this purpose. Scattered buying on the part of general industry is also reported by local sellers. The machine tool industry is a good customer of itself as it seeks to expand capacity.

No change is reported in the delivery situation. Popular sizes of machines are deliverable on a six to eight-month basis, but there are many exceptions and it is not unusual to hear May and June quoted on limited lines. Single machines can frequently be obtained on very short notice, particularly if the competition in bidding is keen.

## Airplane Industry's Buying Holds Cleveland Spotlight

CLEVELAND—The very large buying program of Cleveland Pneumatic Tool Co., world's largest producer of airplane landing gear struts, continues to occupy the spotlight in this immediate district. It is understood the bulk of the machines which the company desires next fall have now been allocated, although certain miscellaneous equipment is still pending.

The terrific pressure under which the aircraft industry is operating becomes more evident daily with the production circle becoming wider and wider, due to the farming out of aircraft parts to jobbing machine shops. A number of these jobbing plants have been in the market for new machine tools recently.

In this immediate district February is drawing to a close with sales comparing quite favorably with other recent months. Some dealers, of course, are hampered by the booked-up condition of producing machine tool plants and are unable to do a whole lot of quoting. There are other considerations also which have prevented acceptance of a larger business volume.

The used machinery market continues quite active here, especially in milling machines and turret lathes which are equally sought by export buyers. At the Kraetke Brothers auction in Detroit two weeks ago some very high prices were noted. For example, a No. 2 K and T

double over arm Universal miller brought around \$5,400.

## Automotive Buying of Tools For 1941 Models Expected

DETROIT—Substantial continued activity by buyers who are seeking equipment for two large foreign aircraft engines helps to keep up machine tool activity in the Detroit area. However, automotive buying for 1941 domestic automobile programs is becoming more and more the bread-winning activity for machine tool concerns and their representatives. During the last week important parts of the Ford program in connection with the six-cylinder engine and its transmission came to their final stages. Go-ahead orders on machine tools for this project and for the Dodge transmission are expected almost any day.

## Foreign Orders Still a Large Factor at Cincinnati

CINCINNATI—Machinery demand in Cincinnati continues to follow a zig-zag pattern, but the line of direction points upward under stimulus of increased foreign purchasing. Substantial orders from England for lathes and some ordering from France and Japan for the same types of machines brought the foreign demand up to its previous level. In addition, several substantial orders from automotive manufacturers and one large electrical equipment producer in this country sustained domestic ordering. Inquiry continues to be very broad and manufacturers indicate that the potential demand continues to be extensive.

Manufacturers continue to be harassed with the problem of deliveries. Minimum promises are now averaging about six months with more extended deliveries becoming increasingly the rule. Factories are operating at capacity since no serious labor shortage has yet developed.

## Chicago Trade Is Gaining; Milwaukee Road Inquiries

CHICAGO—The outstanding development in this market is the increase in recent weeks of orders for miscellaneous machine tools from the general manufacturing trade. February is already far ahead of the January total in one Chicago sales office while another large agency has scarcely any doubts as to this month showing an improvement over last month. Radial drills are particularly active. It is becoming evident that the machinery ordered for the Nash plant in Kenosha is not scheduled for delivery until around June of this year, a fact which almost surely indicates that the

Nash plans for a new low cost car will materialize in the 1941 line. The Milwaukee Road has issued an inquiry for about 25 machine tools for its Milwaukee shops. The Illinois Central list is still pending.

## G-M to Build Large Spark Plug Plant at Flint

DETROIT—Immediate construction of a large new spark plug plant in Flint, Mich., by the AC Spark Plug division of General Motors is announced by L. Clifford Goad, president and general manager. The new plant will comprise 156,000 sq. ft. of floor space, equivalent to nearly four acres, and will be adjacent to the company's other factories which make 29 different automotive products.

## Armco Office Addition Planned

CONSTRUCTION of a \$120,000 addition to the American Rolling Mill Co.'s general office at Middletown, Ohio, is announced by Calvin Verity, executive vice-president and general manager.

The addition, 40 x 154 ft., will provide quarters for the Armco International Corp., traffic department, Armco Railroad Sales Co., Drainage Products Association, and engineering department.

## Bakelite Meeting on Plastics

“NEW Developments in Molded Plastics” was the subject of a technical meeting held Feb. 13 at the Franklin Institute, Philadelphia. This was the second of a series of meetings sponsored by Bakelite Corp., unit of Union Carbide & Carbon Corp., in connection with the Bakelite Plastics Travelcade which is installed in The Institute. More than 400 invited guests were present.

## Financial Notes

A. M. Castle & Co., Chicago, reported net earnings for 1939 of \$349,185 as compared with a 1938 profit of \$216,406.

Ohio Seamless Tube Co., Shelby, Ohio, reports net profit in 1939 of \$260,874 compared with net loss of \$86,128 for 1938.

Allegheny Ludlum Steel Corp. has declared a dividend of 25c. a share on common stock, payable April 1 to stock of record March 18.

Harbison-Walker Refractories Co., Pittsburgh, reports net earnings for 1939 of \$1,869,000 equal, after payment of dividends on preferred stock, to \$1.24 a share on common stock. This compares with 1938 net income of \$736,434 or 41c. a share on common stock.